Thesis/
Reports
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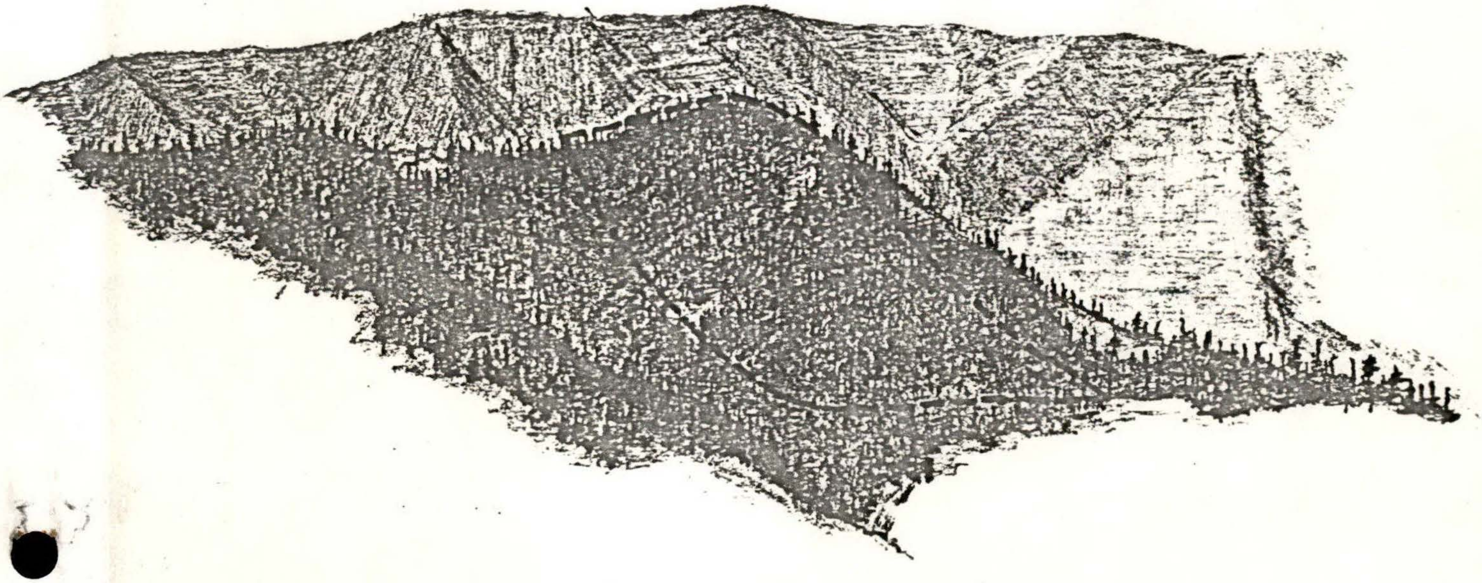
M.

SILVICULTURAL PRESCRIPTION FOR SISKIYOU NATIONAL FOREST GALICE RANGER STATION UNIT 4 OF THE BRIGGS RIDGE TIMBER SALE RIPARIAN ECOSYSTEM CLASS III STREAM

Silvicultural Prescription
for

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream



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Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

Written by Mel Greenup 3/3/81
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Forest Silviculturist

SUMMARY

This prescription is for a Streamside Management Unit (SMU) in Unit 4 of the Briggs Ridge Timber Sale scheduled for sale in fiscal year 1983 on the Galice Ranger District. The stand encompasses 9 acres including the stream. It is overmature and rapidly declining in vigor. The existing conditions, objectives and constraints, and alternatives are included in the analysis. Alternatives evaluated are: (A) unmanaged buffer, (B) uneven-aged management, (C) harvest clearcut with maintenance of broadleaf vegetation, and (D) partial cutting with retention of selected conifers and maintenance of streamside vegetation.

The alternative selected (D) is a harvest system designed to maintain the integrity of the riparian ecosystem, maintain streambank stability, water quality, and wildlife trees.

The operational prescription describes the steps in implementing the selected alternative. This calls for harvesting the stand now, retaining about eight trees per acre for bank stability, wildlife and shading and maintaining other riparian ecosystem vegetation. Reforestation and other cultural activities will be done in conjunction with maintenance of this riparian ecosystem.

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I. Abiotic Factors

A. Location

The Briggs Creek Stand is a Streamside Management Unit (SMU) in Unit 4 of the proposed Briggs Ridge Timber Sale. It is located in Sections 25 and 26, T. 36 S., R. 9 W. Willamette Meridian. This stand straddles a Class III stream running into Briggs Creek, a Class I stream and important for anadromous fish spawning. Unit 4 is 47 acres in size. The prescription stand (SMU) is about 9 acres in size. For location, reference Vicinity Map (Figure 1) and Briggs Ridge Timber Sale Map (Figure 2).

B. Elevation

Elevation ranges from 1,800 feet to 2,680 feet. Midslope elevation is about 2,400 feet.

C. Slope

Stream gradient averages about 45% and varies from 20% to 75%. The sideslopes vary from 45% to 75%. Median slope of the drainage is approximately 65%.

D. Aspect

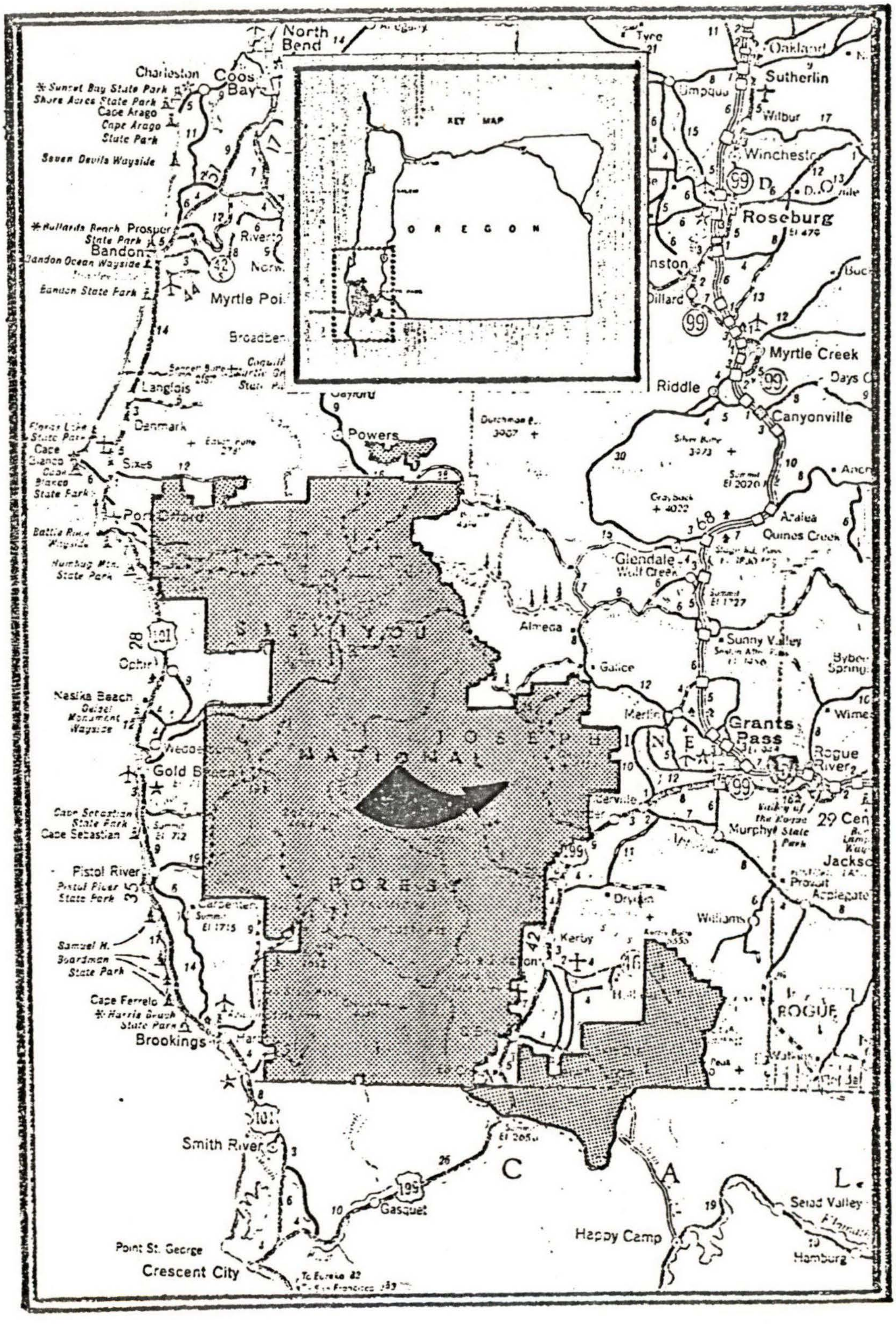
The stream drains west to northwest, varying from 276° to 338° Azimuth. The southerly side of the stream ranges in aspect from east to north. The northerly side of the stream ranges in aspect from west to south. Some topographic shading is provided by the incised nature of the channel and sub-ridge extending downslope along the southern border of Unit 4.

Figure 1

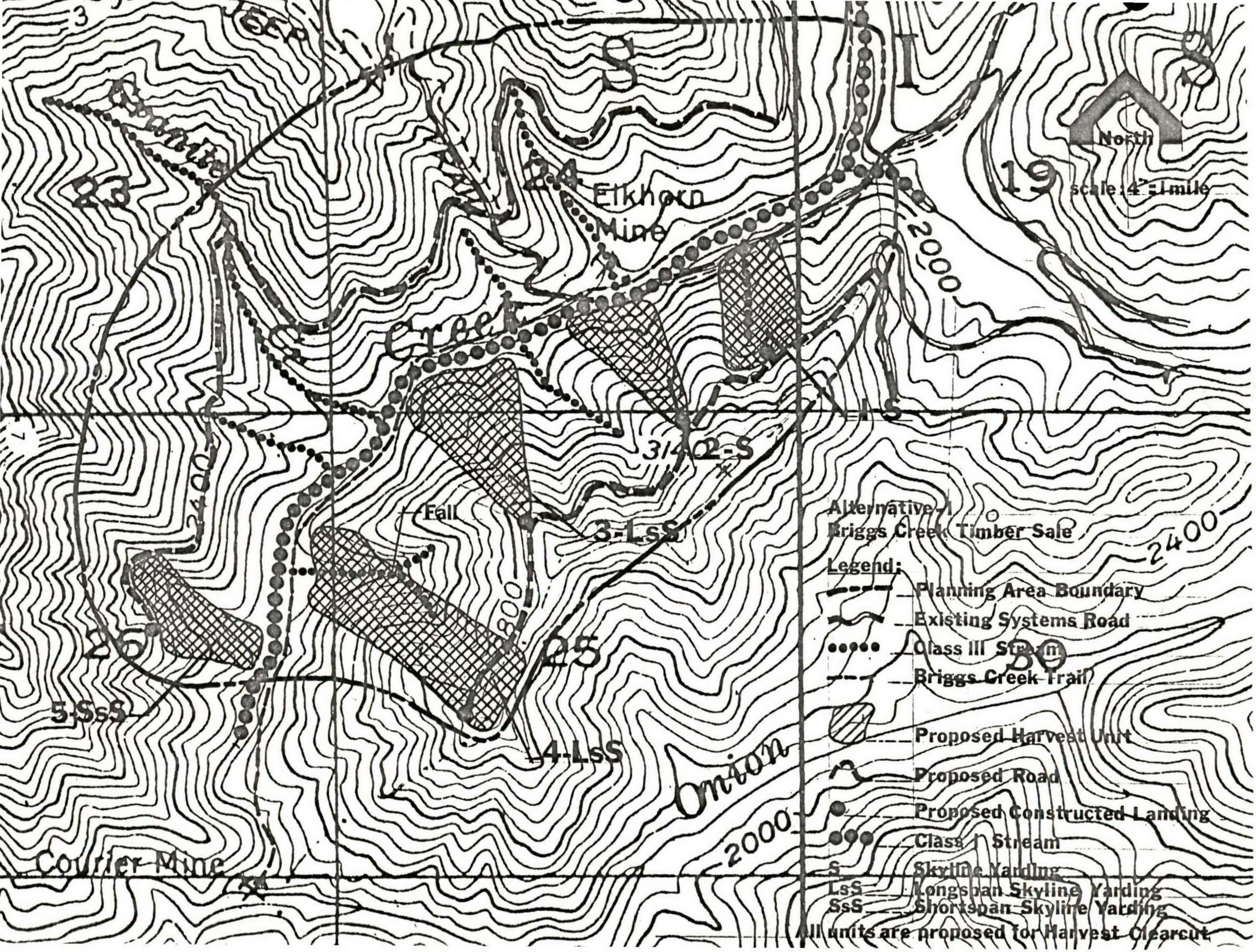
VICINITY MAP

SISKIYOU NATIONAL FOREST
OREGON AND CALIFORNIA

BRIGGS RIDGE TIMBER SALE



KEY MAP
OREGON
North Bend
Coos Bay
Charleston
Sunset Bay State Park
Shore Acres State Park
Cape Arago
Cape Arago State Park
Seven Devils Wayside
Bullards Beach State Park
Prosper
Bandon
Bandon Ocean Wayside
Bandon State Park
Myrtle Point
Norway
Riverton
Broadbent
Langlois
Denmark
Floras Lake State Park
Cape Blanco
Cape Blanco State Park
Sixes
Port Orford
Battle Rock Wayside
Humbug Mtn. State Park
Ophir
Nesika Beach
Geisel Monument Wayside
Wedderburn
Gold Beach
Cape Sebastian State Park
Cape Sebastian
Pistol River
Pistol River State Park
Samuel H. Boardman State Park
Cape Ferrelo
Harris Beach State Park
Brookings
Carpenter Summit El 1715
Powers
SISKIYOU
NATIONAL
FOREST
JOSEPHINE
Smith River
Gasquet
Point St. George
Crescent City
Happy Camp
C A L
Seiad Valley
Hamburg
Tyee
Oakland
Sutherlin
Umpqua
Wilbur
Winchester
Roseburg
Dillard
Myrtle Creek
Riddle
Days Creek
Canyonville
Azalea
Quines Creek
Glendale
Wolf Creek
Almeda
Galice
Sunny Valley
Merlin
Grants Pass
Rogue River
Cave Junction
Kerby
Selma
Dryden
Williams
Provolt
Applegate
Jacksonville
Murphy
Valley of the Rogue State Park
ROGUE
Wimer
101
199
99
42


North
scale 4" = 1 mile
Alternative 1
Briggs Creek Timber Sale
Legend:
Planning Area Boundary
Existing Systems Road
●●●●● Class III Stream
Briggs Creek Trail
Proposed Harvest Unit
Proposed Road
● Proposed Constructed Landing
●●● Class I Stream
S Skyline Yarding
LsS Longspan Skyline Yarding
SsS Shortspan Skyline Yarding
All units are proposed for Harvest Clearcut
23
24
19
26
25
30
Elkhorn Mine
Granite
Creek
Onion
Courier Mine
Fall
1-S
2-S
3/4
3-LsS
4-LsS
5-SsS
2000
2000
2400
2400
2800

E. Climate

Average annual precipitation of about 70 inches is delivered predominately as rain. Only 10-15% comes during the months of May through September. Some occurring low clouds and fog are important during the winter-spring period. Average temperatures range from 30°F in winter to about 70°F in the summer. Occasional short periods reach a maximum of 100°F.

Plants present, such as large quantities of moss, dogwood, bigleaf maple, swordfern and vine maple, indicate a favorable above-ground environment through most of the year.

F. Soils

According to the Geologic Map of Oregon West of the 121st Meridian (U.S. Geological Survey 1961), the area bedrock is amphibole gneiss that may be altered equivalent to sediments in the Applegate group. The age of this bedrock is unknown. The Soil Resource Inventory (USDA 1979) concurs with this classification. Field observations (Atzet and Greenup 1/81) verified this and also that the parent material is metamorphosed sediment of variable density.

Soil depth is moderately deep, ranging from 10 to over 50 inches. Very little surface rock is present outside the stream bed. In general, tree rooting depth is greater than for most forest soils. Some roots have penetrated in excess of 10 feet. Stability of the landtype (66) is moderate.

This soil is one of the most productive on the Forest. PH ranges between 6.0 and 7.0. Textures vary from sandy loam to small inclusions of gravelly loam. Soil depth and Site Class are both higher than indicated in the S.R.I. Measured site quality is Site Class II (IV and V in the S.R.I.). The favorable above ground environment (low diurnal temperature variation and high atmospheric moisture) is a major contributor to these differences. Topographic location (depression) that gives protection from dessication by wind, shading from topography, trees and brush, and close proximity to the lowest point in the terrain where it is influenced by base flow make this microsite significantly different than the surrounding terrain. The litter layer has an average depth of about three-fourth of an inch.

The stream sluiced out apparently during the 1964 flood. This left a clean channel to bedrock for two-thirds the stream length. Small alluvium has accumulated in places and is subject to washout with disturbance or removal of temporary barriers. Additional alluvium, mixed with branches and litter, is in small accumulations against down and standing trees in the channel. Large and more continuous quantities of alluvium and debris is deposited near the unit bottom where the gradient changes to about 20%. For a complete description of the channel morphology, see Hydrologic Assessment (Appendix A).

II. Biotic Factors

A. Distinguishing Characteristics:

The stand is a component of a riparian ecosystem that varies in width from 100 to 200 feet. It is distinguished from the surrounding stand by a break in slope to the stream and a change in kind and quantity of plants that indicate a more favorable moisture regime.

B. Stand Description

The stand is in the Mixed-Evergreen Zone of the western Siskiyous described by Franklin and Dyrness (1973). It is also comprised of two distinct plant communities (Appendix B).

The upper portion of the stand, about 90%, is a tanoak/Oregon grape/swordfern community. It is in the late seral stage and is highly decadent with snags scattered throughout the stand. Although sugar pine was not identified in the stand exam, it is present in the adjacent stand and grows as well or better than Douglas-fir.

The lower tree canopy is primarily tanoak with some bigleaf maple and dogwood. Tanoak dominates the understory where Douglas-fir is sparsely stocked or absent and ranges in height between 10 and 40 feet. Bigleaf maple and less so dogwood are unique to the riparian ecosystem and can be used in defining its boundaries.

The shrub layer is primarily dwarf Oregon grape with salal next in importance. Other plants present include trailing blackberry, rose, hazel, red huckleberry, twinflower, and hairy honeysuckle. Salal can be used to indicate the riparian ecosystem boundary where it is abundant. Swordfern is the dominant forb present and is also an excellent indicator of where the ecosystem changes.

The Douglas-fir present are about 190 feet in height and average about 46 inches in DBH. Basal area is 153 square feet and gross volume is 76 MBF per acre. About three snags per acre are scattered through the stand.

The downstream portion of the stand, about 10%, is a Port-Orford-cedar/vine maple/swordfern community. It is similar to the upstream portion of the stand except for the presence of cedar which makes up about 30% of the stand. The shrubs are also similar to the upstream stand except that here vine maple dominates this strata with Oregon grape its major associate.

Fomes pini and Polyporus schweinitzii are prevalent in the stand. Some blow down is present also. Snags have been most likely created by these agents followed by bark beetle attacks. Present growth rate of the oldgrowth is about 40 rings per inch.

No designated threatened or endangered plants have been found in the area.

As discussed under Soils, this stand is on a site higher than average for the area and exhibits few limitations to seedling establishment or growth.

C. Stand History and Successional Trends

Evidence of past fire is visible throughout the stand and adjacent area. In the past 100 years or so miners burned the area to keep it clear. This pattern tended to favor madrone and Douglas-fir. With the cessation of burning, tanoak is favored and will assume dominance as the climax species in the tanoak/Oregon grape/swordfern community.

Port-Orford-cedar is the dominant species in the understory in the Port-Orford-cedar/vine maple/swordfern community. Continued fire control would favor the Port-Orford-cedar and it would become the climax species.

D. Wildlife

Native trout and anadromous fish are present in Briggs Creek. The 1980 count of spawning adults indicated the presence of 100 Chinook Salmon, 50 Coho Salmon and 200 Steelhead. Resident trout utilize nearly all of the Briggs Creek tributary streams in numbers of 50-75 per 100 feet of stream (Appendix C).

Black-tailed deer, elk, and black bear live and forage in the area. Many other species inhabit the general vicinity. These include grey squirrel, flying squirrel, red-tailed hawk, common flicker, pileated woodpecker, yellowbellied sapsucker, blue grouse and winter wren. Of significance to reforestation is the presence of mountain beaver. The riparian ecosystem is excellent wildlife habitat and fresh mountain beaver sign is present throughout this area.

The general area contains some good spotted owl habitat, and while calls were made, no responses were heard (Appendix D).

E. Local Experience

Reforestation in the general vicinity on similar sites has been good to excellent; however, release has been needed early in the life of new plantations. Deer and elk browse of conifers is occurring at nearby plantations and can be expected in new cutting units.

III. Social Components

A. Visual

The Visual Quality Objective for this area is Maximum Modification, which allows for management activities to dominate the characteristic landscape. However, activities must borrow from naturally established form and appear natural when seen as background.

B. Recreation

Briggs Creek Trail (#1132) is located below the proposed treatment area. Most of the use is connected to fishing, camping, hunting, and mining.

C. Land Uses

A mining claim is located immediately below the treatment area and is currently being worked. A reconstructed diversion and ditch exists about 100 feet outside the lower reaches of Unit 4.

IV. Objectives and Constraints

A. Management Direction

This stand is covered by Preferred Alternative "D" of the *Final Environmental Statement for the Rogue-Illinois Planning Unit* (USDA FS, 1979) and it fits into Management Area 1 as described in that plan. In effect, this timber sale is within the Coordinated Resource Management Area, where the Forest Service manages the land to:

1. Obtain full timber yields consistent with land capabilities and applicable management constraints.
2. Provide enhancement of sites for big game habitats.
3. Provide and maintain small areas containing exceptional aesthetic, scenic, historic, archeologic, geologic, botanic, zoologic, or scientific features.

It further states that timber harvest will be planned for commercial forest acres and that "Silvicultural techniques will be utilized to attain maximum timber yield consistent with the land capabilities and applicable timber and other resource management constraints in each location." Techniques to be applied as appropriate include: partial cutting and clearcutting for regeneration purposes, planting, release from brush competition, precommercial and commercial thinnings.

The National Forest Management Act of 1976 (PL 94-588) provides direction for the management of all lands in the National Forest System. Some of the requirements of this act can be applied to stand level management. There must be assurance that lands where timber will be harvested can be adequately reforested within five years. Clearcutting will be used only where it is determined to be the optimum method. Prior to harvest, stands shall generally have reached the culmination of mean annual increment of growth. The potential environmental, biological, esthetic, engineering, and economic impacts must be assessed on each sale area. The National Forest Management Act of 1976 also requires that management plans provide for diversity of plant and animal communities.

The Briggs Ridge Timber Sale Environmental Assessment (Siskiyou National Forest, 1981) also references the above and, in addition, directs that a silvicultural prescription be developed and implemented for the riparian ecosystem in Unit 4.

This prescription must meet policy and Management Requirements and Constraints of the Siskiyou National Forest Riparian Ecosystems Management Policy. (Appendix E) and R-6 Supplement 42(2526-Riparian Areas).

B. Evaluation Criteria

These criteria were developed from the management direction by the Interdisciplinary Team for the proposed Briggs Ridge Timber Sale. Each alternative will be measured against two types of criteria:

1. Each alternative must meet certain process criteria to be viable.

2. Decision criteria are evaluated to help identify the preferred alternative.

   a. Process Criteria

      (1) All proposed cutting units must be reforestable within five years of harvest.

      (2) Identify and assess the impacts on all cultural resources within the Planning Area. Protect any cultural resource of significance.

      (3) Protect any threatened, endangered, or sensitive plants and animals found within the planning area.

      (4) Meet all State and Federal water quality standards.

      (5) Maintain soil productivity and its ability to take up and store water.

      (6) Meet requirements of Executive Orders 11988 and 11990 in regard to floodplain and wetland management.

   b. Decision Criteria

      (1) Reduce fuels loading to an MM or lower rating following harvest (FSM 5151.13B).

      (2) Maintain habitat diversity for wildlife - meet State habitat guidelines.

      (3) Meet Forest snag guidelines.

      (4) Provide for utilization of unmerchantable material for fuelwood cutters following harvest.

(5) Manage all acres within proposed harvest units intensively for continued crops of timber.

(6) Meet the Visual Resource Management Objectives of Modification and Maximum Modification as viewed from Briggs Taylor Road.

(7) Provide for a logging system which will minimize soil disturbance.

(8) Logging in Streamside Management Zones to meet Siskiyou Riparian Management Policy (FSM 2520.3).

(9) Provide for efficient management of the area in terms of economic, manpower and energy resources.

C. Silvicultural Objectives

The existing stand is not capable of meeting the objective for wood production. The short term objective is to regenerate the stand and perform future tending needed to maintain vigorous growth relatively free of competition.

The long term objective is to maintain diversity to meet the requirements of applicable laws and regulations. Priority objectives are to maintain the integrity of the riparian ecosystem, retain soil in place and maintain water quality in conjunction with timber management as stated within the riparian ecosystem management policies.

V. Alternatives Considered

These alternatives are evaluated in light of those management requirements, constraints and mitigative measures included in the E.A. (Appendix F).

A. Untreated buffer. Boundaries of the riparian ecosystem will be utilized. No management will be done for timber products and no burning within buffer.

B. Uneven-aged management. The greatest number of stems will be in the small diameter classes with the number decreasing as size increases until the largest trees are few and well scattered through the stand.

C. Removal of all commercial trees leaving residual trees and other vegetation in healthy condition within 50' of each side of the stream. Manage intensively for timber products. Rotation will be 90 years.

D. Partial cut oriented to optimizing maintenance of the riparian ecosystem, wildlife habitat, soil stability and water quality. Rotation to be 90 years except for retention of wildlife trees and trees required for bank stability. No intermediate harvesting would be done.

VI. Evaluation of Alternatives

Table 1 displays and summarizes the evaluation of the alternatives considered. This format was selected due to lack of substantive data to quantify impacts. Therefore, a qualitative approach has been utilized in establishing importance and impact ratings for each criteria which then provides a relative index between the alternatives. To obtain any weighted value, multiply the Importance Rating by the Impact Rating for the appropriate alternative.

Varying from the normal environmental assessment, the alternatives have also been evaluated as to how well each meets the Process Criteria. This usually requires only a "Yes" or "No" response; alternatives not meeting any one of these would automatically be dropped from further consideration. In the case presented herein,

TABLE 1

Impact Rating Scale 0=None or Negl. + Benefit 1=Minor - Adverse 2=Moderate 4=Major	Importance Rating 1=Low 2=Mod. 4=High	Alternative A Untreated Buffer		B Uneven-Aged		C Commercial Removal		D Resources Optimization	
CRITERIA		Impact Rating	Value	Impact Rating	Value	Impact Rating	Value	Impact Rating	Value
Process Criteria			(0)		(+16)		(+7)		(+32)
(1) 5-Year Reforestation	4	0	0	+2	+8	+4	+16	+4	+16
(2) Cultural Resources	1	0	0	0	0	0	0	0	0
(3) Threatened and Endangered Species	2	0	0	0	0	0	0	0	0
(4) Water Quality Standards	4	0	0	+1	+4	-1	-4	+2	+8
(5) Maintain Soil Productivity	4	0	0	+1	+4	-1	-4	+2	+8
(6) Floodplain and Wetland Mgt.	1	0	0	0	0	-1	-1	0	0
Decision Criteria			(-21)		(+1)		(-1)		(+15)
(1) Reduce Fuel Loading to MM	1	-1	-1	+1	+1	+1	+1	+1	+1
(2) Fish and Wildlife Habitat	2	0	0	-1	-2	-2	-4	-1	-2
(3) Meet Snag Guidelines	2	0	0	0	0	-2	-4	+1	+2
(4) Provide Firewood	1	0	0	+1	+1	+2	+2	+1	+1
(5) Intensive Timber Mgt.	2	-4	-8	-1	-2	+4	+8	+2	+4
(6) Visual Resource Mgt.	1	0	0	-1	-1	-2	-2	-1	-1
(7) Logging System to Minimize Soil Disturbance	2	0	0	-1	-2	-1	-2	0	0
(8) Riparian Ecosystem Mgt.	4	-1	-4	+1	+4	-2	-8	+2	+8
(9) Economics and Efficiency	2	-4	-8	+1	+2	+4	+8	+1	+2

the only alternatives that meet the process criteria are B and D. This display, however, allows initially unacceptable alternatives to be fully evaluated without bias of interpretation. For the untreated BUFFER ("no action") alternative, NEPA requires evaluation regardless of whether or not it meets the Process Criteria.

Alternative A is a no-action or deferment alternative. With no management, the stand will continue to deteriorate and progress toward climax as described under Stand History and Successional Trends. In regard to most of the criteria, the Impact Rating is neutral or negligible. However, the criteria for fuel loading and ecosystem management has a minor negative impact. No reforestation will be done. Falling trees and debris would continue accumulating thus increasing the potential for bank undercutting in areas of high instability. Fuel loading will gradually increase. Mitigative measures will be more difficult because no management is scheduled. In regard to intensive management and economics, there is a significant negative impact because no yields of timber products will be realized.

Alternative B is neutral to positive in regard to the Process Criteria and slightly positive in regard to the overall Decision Criteria. It has a low negative impact on fish and wildlife habitat and visual resources and moderately negative impact regarding selection of a system to minimize soil disturbance. Changes in sedimentation and temperature potential will be slightly increased because relative emphasis of management will be to select trees to develop a certain stand structure. The moderately negative impact from the logging system on soil is created from the need to reenter the stand more often than the even-age alternatives. In regard to economic efficiency, there will be a low level benefit because long term yield (Curtis 1975) would be close to that from even-age management but costs and use of energy would be greater. If, in the future, helicopter logging is done to avoid damaging the plantation upslope, efficiency would decrease because of greater costs and energy requirements. One serious drawback to this alternative is the fact that even-age management will exist on the entire periphery. Repeated entries to the riparian zone will require yarding through the plantation surrounding it. This would result in unacceptable crop tree loss; yarding roads would be 20-30 wide because of the absence of rub trees. The minor negative impact in regard to intensive timber management is also derived from the fact that the present stand (large old-growth and almost no young growth) does not lend itself to readily move toward uneven-age management.

Alternative C is the most economically efficient of all alternatives and also yields the highest level of wood products. However, it does not satisfactorily meet significant process and evaluation criteria. Even though hardwoods and brush will offer protective cover to a significant part of the area, it is the most drastic alternative evaluated. Streambank stability will not be enhanced and may be negatively impacted. Snag habitat will be eliminated, and the overall riparian ecosystem would be negatively altered. On site water temperatures will be more adversely effected but will not be high enough to affect Briggs Creek (Appendix G).

Alternative D has a low negative impact on fish and wildlife habitat and visual quality because some tree removal will occur and holes will be created by yarding corridors. It has a minor positive benefit in regard to economic efficiency because dollar benefits will be realized but at a much lower level than Alternative C. Intensive management is moderately positive in comparison to the other alternatives. It is more efficient than Alternative B but less efficient than Alternative C. Because long term yields from Alternative B will be about the same as Alternative C, only Alternative C and D will be compared for economic efficiency. Another reason for this comparison is to display the impact on yield from retention of trees for bank stability and wildlife.

Summary of Economic Efficiency

	Alternative C	Alternative D
Soil Expectation Value	$1172	-$404
Benefit/Cost Ratio	1.93	.76
Present Net Worth	27,658	10,800
Yield From Next Rotation	63.3MBF	22.8MBF

The above is a synopsis of the economic analysis (Appendix H) and yield differences from managed yield tables (Appendix M and N). Dollar and yield are per acre values.

As indicated above, Alternative C gives the most favorable financial benefit and results in the greatest yield of timber. The difference in yield and economic efficiency between these two alternatives is a measure of the cost of retaining eight large trees per acre for resource protection and wildlife habitat maintenance. However, it must be remembered that this economic analysis is for timber values only and that if dollar values were considered for other resources, the value of Alternative D would be more favorable and Alternative C less favorable due to its negative impacts.

This, coupled with the fact that it also has the most positive mix of all elements evaluated, leads to selection of Alternative D as the preferred alternative. Alternative D also best meets the silvicultural objectives for this stand.

VII. Operational Prescription

A. Objective and Stand Development

The objective of this stand management is to regenerate the stand in conjunction with the proposed clearcut above it. Harvesting will be designed to maintain the integrity of the riparian ecosystem, provide for streambank stability, reserve wildlife trees and provide for shading.

Under this management regime, fewer conifer trees per acre will be managed for crop trees than the plantation above due to retention of large trees occupying about 90 ft^2 of growing space through the rotation. A significant component of the stand is tanoak. Small quantities of bigleaf maple and dogwood also occur in association. About 70 Douglas-fir per acre will be grown as crop trees. Hand weeding will be done to maintain at least this number. Existing thrifty conifer saplings and poles will be maintained as part of this component. Ground vegetation will be maintained as part of the ecosystem. The old-growth trees retained will gradually decline in vigor and may need replacement by the end of the next rotation. At that time, an equivalent number may be selected to replace those that die.

The operational prescription will reflect the management requirements and constraints outlined in the E.A. (Appendix F).

B. Layout and Marking

Boundaries of the area to be managed as a streamside management unit will be guided by the use of terrain features and plant indicators. This will result in a boundary that ranges from fifty to 150 feet measured horizontally from both sides of the stream. This demarcation can be seen where the presence of bigleaf maple, dogwood, swordfern and vine maple is not apparent upslope from the stream. It also coincides with a dramatic decline in the number of salal plants. The boundary will also be located about fifty feet upslope from the falls, the small patch of snags (5 or 6) upstream from the falls, and an equal distance around bank failures. Boundaries will be clearly marked with yellow ribbon and partial cut signs. The downstream boundary will be no closer than 50 feet to the Briggs Creek Trail. This will be the responsibility of the Presale Forester. According to predicted water temperature changes, shade requirements for this stream are minimal (Appendix G), therefore, shading requirements will be met by retention of trees selected primarily for bank stability and wildlife habitat.

The following trees will be designated for retention:

1. All hardwoods within the SMU.

2. All conifers under eighteen inches in dbh.

3. All snags.

4. All trees over 40" dbh with a head lean toward the stream in excess of 6°. This is equal to the top being about 20 feet off the stump.

5. Large conifers within the dbh range of 48-60" that are relatively straight with high crown ratios. Most of these are within close proximity to the stream (50-75') and display large root systems that are partially visible and appear to be offering significant bank stability. These trees have a greater rooting depth than normal and are the most windfirm trees in the stand.

6. Down trees keyed into stream banks will also be designated for retention in place.

This prescription and photographs (35mm slides) of stream conditions and sample trees to be marked for retention will be reviewed with the marking crew prior to field work. This will be the responsibility of the Silviculturist. The Silviculturist and Watershed Staff will work with the crew during the first day of marking to facilitate understanding of the guide.

Following the above guide will result in the retention of about eight live conifers and one or two snags per acre.

C. Logging (Barnhart, Appendix I)

Directional falling will be required to fall trees toward the outside of the SMU. Jacking will meet this requirement. Trees designated for removal that cannot be controlled by jacking shall be line felled. This will be designated on the Sale Area Map and be directed by Provision C6.41 in the contract. The Contractor may fall only those snags that are safety hazards. The Timber Sale Appraisal will appraise those estimated to be felled for fire danger and or safety purposes. This will be the responsibility of the Sale Administrator to explain in the Prework Conference and monitor during logging.

A major skyline system is required with capabilities of full suspension over the Riparian Zone and 100 foot lateral yarding as shown on the Sale Area Map. Contract provision C6.42 will be utilized to require corridor width only wide enough to pass the carriage and turn of logs. This will be monitored by the Sale Administrator during the course of logging.

During the logging operation, all logs and debris falling into the stream channel will be removed within 48 hours or left depending upon the judgment of the Sale Administrator (Contract provisions B6.51 and C6.51). In making this decision, consideration will be given to whether there is channel blockage and whether removal will do more damage than leaving it. This will be designated on the Sale Area Map and will be the responsibility of the Sale Administrator.

The District Hydrologist will monitor Briggs Creek before, during and after completion of logging. The District Silviculturist and/or Resource Officer will monitor the operation at least once during progress.

D. Slash Disposal

Fuel loading after logging is estimated at 25 tons per acre (Appendix J). This is relatively low and can be effectively treated by hand piling and burning.

During logging operations, all tree tops falling in the SMU will be pulled outside the boundary (Contract provision C6.7). This will be designated on the Sale Area Map and will be the responsibility of the Sale Administrator to monitor.

Hand fireline will be required to protect the SMU when the clearcut upslope is broadcast burned. The line will be extra wide and cupped on the steeper slopes to prevent burning debris from rolling into the SMU.

Hand piling and burning of slash to abate the hazard will be done after completion of logging. Coupled with this will be cutting and burning of damaged saplings and hardwoods to clean up the site and aid in planting spot preparation. This will be done during moist periods to facilitate continuous piling and burning. The Fuels Technician will be responsible for accomplishing this work and will collaborate with the District Silviculturist to establish criteria for cutting damaged trees. Financing of this work will be from a share-cost between Brush Disposal and Knutsen-Vandenburg funds.

E. Reforestation

Planting of this riparian zone will be done along with reforestation of the upslope clearcut. With the planting spots now available and additional spots that will be created through logging and slash disposal, a total of about 200 spots per acre will be available for planting. Hardwoods will make up less than 10 per cent of the total stand basal area. Of significance is that the initial establishment of this stocking level will not prevent future management options in case the predicted stockability is too conservative.

Douglas-fir seedlings will be planted in February - but no later than March - during the season following hand piling and burning. Soil moisture is high at this time and the soil temperature cycle is on the upswing, providing conditions most favorable to survival and growth. Seedlings from selected parents will be planted and will be bare root with a 4-5 millimeter stem diameter, 20-30 centimeters in height, and with a shoot/root ratio no greater than 2.0. To enhance survival, weather guidelines for planting will be followed (Greaves, 1978).

This soil is deep and friable with very little surface rock. Under these conditions, hoe planting is expected to be quite successful.

Protection from clipping by mountain beaver and browsing deer and elk will be done within one growing season after planting. Though mountain beavers are present and deer and elk will increase their use of the area, there appears to be other food sufficiently available. Because of this they are not expected to significantly damage seedlings the first year. This short delay will also allow caging only the surviving seedlings, thus reducing costs. Thirty-inch rigid vexar, staked with lath and tied in two places will be placed on all planted seedlings. The District Silviculturist will be responsible for implementing this work through the planting contract inspectors, and will review work in progress to insure that quality standards are met.

F. Evaluation and Additional Treatment

During the fall, after the first growing season, a stocking survey will be conducted to evaluate success of planting. Survival and seedling condition will be documented. Special note will be taken for early release needs. Lateral and height growth measurements will be made for conifers and hardwoods. This will allow estimation of when release will be needed.

Another field survey will be made after the second growing season to verify release needs and success of the damage control caging. Because of the hardwoods present at the time of planting it is reasonable to expect early release will be needed. It is anticipated that this will need to be done by the third growing season.

Because of the close proximity to the stream, aerial application of herbicides cannot be done. Therefore, manual release will be the methodology if release is needed. This will be a combination of chemical stem injection and hand cutting. Those stems larger than 2" in dbh may be treated by injection and smaller stems can be cut with a power saw. About 150 trees per acre should be released to insure enough future crop trees. Hardwoods as high as 50% of the seedling height and within 6 feet will be treated.

A third year stocking survey will be taken to evaluate survival and seedling condition. This will also be an early evaluation of release work done. A formal release survey may be done a full growing season after release if needed.

Another stocking survey will be done after the fifth growing season to verify reforestation success. A visual evaluation of release success will also be done and noted on the survey summary.

During year 14, a stand examination will be done to evaluate the stand for thinning needs and damage from insects, disease or physical elements. The decision to thin will depend upon how the stand develops with the old-growth component.

APPENDIX A

Hydrologic Assessment
by

Robert F. Ettner*
Hydrologist

October 9, 1981

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

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*Accompanied by Don King, Forest Fisheries Biologist and Mel Greenup, Forest Silviculturist.

HYDROLOGIC ASSESSMENT - STREAM MORPHOLOGY AND RIPARIAN VEGETATION OF BRIGGS CREEK TRIBUTARY.

Location

T. 36 S., R. 9 W., Sections 25 and 26. Direct tributary to Briggs Creek from eastside; between named tributaries of Onion Creek and Secret Creek.

Physiographic Features (for entire tributary watershed)

Drainage Area: 110 acres (0.17 square miles)
Elevational Range: 1,800 to 3,200 feet
Geology: Metamorphosed Sedimentary
Mean Slope: 65%
Orientation: Principally west Equivalent Slope of approximately 283°
(Aspect Components: North - 35%; West - 45%; South - 20%)

Hydrologic Characteristics (for entire tributary watershed)

Shape: Pear
Perimeter: 1.62 miles
Compactness Coefficient ($0.28\ P/\sqrt{A}$): 0.42
Form Factor (A/L): 0.28
Maximum Stream Length: 0.55 miles
Equivalent Main Stream Slope: 38%
Drainage Density (D_d): 6.18

Order	No. (F)	Length (M:)
1	5	0.60
2	2	0.25
3	1	0.20
		1.05

Stream Order: 3

Channel Frequency (F/A): 47

Geomorphic Cycle: Early Mature

Drainage Pattern: Dendritic

Water Yield

Average Annual Flow: 0.02 cfs*

Total Annual Yield: 330 acre feet* = 36"

Est. Flow for October 9, 1980: < 0.1 cfs

Peak Flow (unverified; field est. from channel morphology): 25-40 cfs

*Made from Slate Creek at Wonder streamgage; represents conservative estimate for Briggs Creek.

Water Quality

Data as to Briggs Creek and tributaries water quality would have to be obtained from Galice District files. Quality, though, should meet all beneficial use criteria and State standards except during major storm periods, wherein turbidity and suspended sediment will dramatically increase for a short duration and in direct relation to high streamflow.

Water Temperature: 52°F; 10/9/81 PM

Stream Classification

Class III SMU (Tributary to Briggs Creek, a Class I with anadromous fishery and heavy recreation use). Perennial flow exists on Order 2 and 3 channels for length of 0.55 miles. Perennial seeps begin following interrupted underflow; defined by area contributions of 20+ acres on both tributary and main stem.

Stream Reach Descriptions

Segment 1 (Trail to entrenched section):

Length approximately 400 feet.

Broad bottom alluvium; channel braided; flow interrupted; coarse gravel and sand of alluvial nature resulting from old mining activity and/or debris flow from mass failures and subsequent channel scouring in Segments 3 and 4.

Channel condition fair - "jumbled" nature with woody debris, and large bed material of boulders and gravel; aggraded; good shade throughout - principally young conifer (P-O-C); little fishery or aquatic value; gradient 10 percent.

Diversion and recently reconstructed ditch for mining purposes exists immediately above trail, and extends approximately 500 feet to alluvial bench of Briggs Creek. Water rights unknown; rework of old tailings expected.

Segment 2 (Entrenched section):

Length approximately 200 feet.

Broad alluvial floor with narrow entrenchment of 3 to 4 foot depth and 10 foot width; large P-O-C's root support of vertical channel banks.

Channel condition poor - "gully" type, but with good bottom microclimate; heavily shaded by old-growth P-O-C; little understory; gradient 10 percent.

Segment 3 (above headcut of entrenchment to falls):

Length approximately 700 feet.

Steep channel gradient (35 percent) with over-steepened side slope creating v-shape; degraded 3 feet to bedrock control creating "bench" effect along channel bottom; small pockets of fine alluvial accumulation very limited to flatter benches; westerly aspect and highly entrenched in topography (resulting in topographic shading for much of year); appears scoured by debris flow of recent origin (10-20 years) - limited vegetation of all types within 20-50 feet of channel bottom, grassed, and barren appearance; residual trees providing limited bank stability -

generally greater than 50 foot distance from channel; old growth conifers and hardwoods upslope on south side providing dominate summer shade; mass stability of sideslopes - moderate; channel orientation 290°; SMU boundary delineations should extend beyond 50 to 70 feet due to sideslope conditions.

Channel condition - poor, but recovering; stream values negligible; no debris; no shade in direct contact with channel, but relatively well shaded by old growth vegetation and topography; bottom stable to bedrock; channel sides weakly resistant to sidecutting, but channel not subject to meander due to steepness.

Segment 4 (from falls and confluence with Tributary A to interrupted flow):
Length approximately 1,000 feet.
Small mass failures prominent and frequent in upper portions and are confined to morphological adjustment of channel (oversteepened channel sideslopes due to downcutting of stream in geologically youthful terrain). Stated otherwise, the stream has downcut and subsequently undercut the toe of the slope, causing loss of slope support. Mass failure active on both sides of channel near upper reach of this segment (100 yards or so below terminus of perennial flow). All flows are limited in activity and extent to translational and rotational failures of 10-15 foot depth and extending upslope from channel 50-70 feet. These landslips have occurred over time and will continue with or without external activity. Some reduction of channel sidecutting can be accomplished through selective removal of recent contributions of large old-growth conifer root masses deflecting flow; however, from stream energy dynamics, these could be reasoned as being beneficial to long-term stability of this channel segment. Continued replenishment of large woody material should be guaranteed over time (reference Heede's findings for the RMF & R Expt. Sta.).

Occasional bedrock control from the falls to midway on this segment exists. This feature is primarily a result of the recent debris flow scouring action (whose source area begins in conjunction with numerous mass failures from that midpoint and above). Limited old-growth within 25 feet or so occurs in this lower reach (same reason as for Segment 3). The few trees that do exist in or near the channel are invaluable to channel sideslope competence. The conifers and hardwoods on the south side again account for the majority of shade; lesser topographic shading than Segment 3 is due to shallower position on the terrain.

Interplanting of conifers in Segment 3 and 4 on currently barren sites and post-harvest disturbed areas would enhance future shading. Hardwoods, such as alder, planted along the stream course would directly and immediately improve water temperature; however, water losses through evapotranspirative demands could significantly impact low flow conditions. Heavier ITM marking on the north side is preferable due to limited shade contribution and greater inherent slope stability (south aspect relationship). Average SMU boundary delineations on the north side probably should vary from a minimum of 50 foot; on the south side of the channel, delineation should average at least 70 feet - and both variable depending on site specific needs and inherent instability.

Channel conditions fair to poor - considerable large debris in channel confines in upper reaches; degraded condition of 2 to 5 feet has created unprotected banks subject to cutting; sediment source area in upper reach; except for bedrock, little natural material other than woody debris is capable of armoring bottom and banks; gradient quite variable (from 20 to 40 percent); sideslopes less steep than in Segment 3.

Tributary A (from confluence with Segment 4 at falls to interrupted flow).

Length approximately 600 feet.

Perennial flow of < 0.01 cfs continues to location where it becomes interrupted and buried under alluvium of fractured rock debris; gradient of 20 to 30 percent; no mass failure problems.

Channel conditions good - bottom composition bouldery, stable, with excellent energy dissipation; sideslope and banks of low angle and stable; multi-storied hardwoods and conifers providing adequate shade for this severe exposure (mostly SW).

Management recommendations would be to leave small healthy conifers, snags, and hardwoods within 10 to 30 feet of the channel; cleanout logging debris from channel and pile outside of SMU; prescribe burn downhill to SMU, keeping fire outside of narrow strip.

APPENDIX B

Ecological Survey

by

Area 5 Ecologist Thomas Atzet

January 22, 1981

Siskiyou National Forest
Galice Ranger District

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

Stream Condition

The stream drains northwest at approximately 317° Azmuth, drops about 800 feet in elevation (from plot 1 to plot 6) and averages a 45% gradient - see pages 2 and 3.

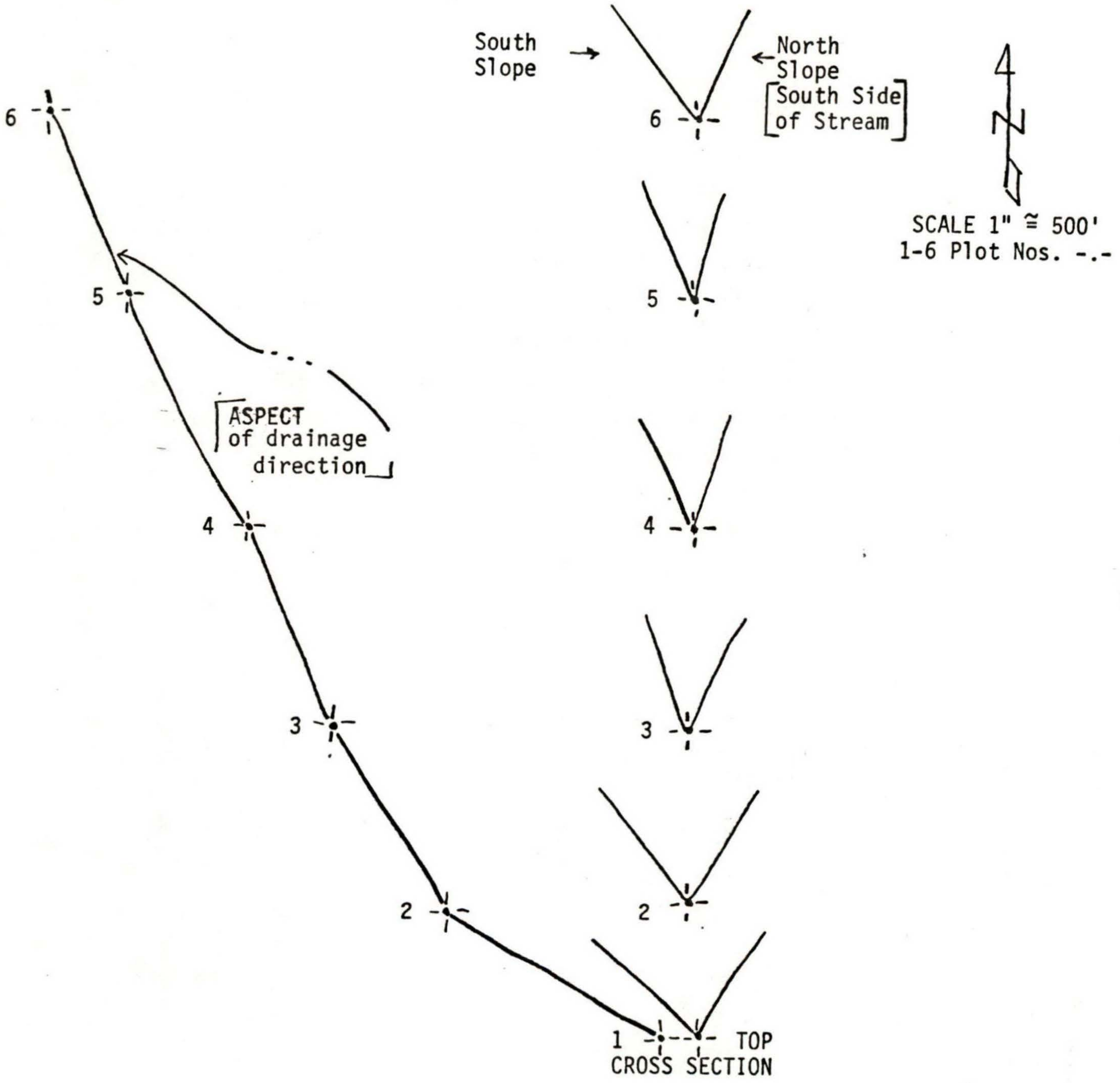
The parent rock is metamorphored sediment of variable density and hardness. The hardest material is midway between plot one and six. Here, there are two falls about 20 feet high and the stream cross section is steeper. Both conditions attest to the midstream area as being most competent. There has been recent mining activity and flooding (1964). Each have contributed in forming the present channel. There are two old flumes in the lower reaches of the creek and some areas may have been hydrolically mined. Where the parent rock is soft, soil depths are greater than 50 inches but soil shallows to less than 10, with high rock content, in areas where bedrock is hard. A fair estimate would be that less than 15% of the toal reparian area has shallow, extremely dry soils. As has been my experience, these sediments have a high clay content and a high water holding capacity. The rooting characteristics are extremely good, major roots have penetrated to greater than 10 feet.

The mineral composition is extremely fertile. The area is within a band of amphibolites that produce the highest sites on the forest. However, the area is mixed. There are a few ridges that are extremely bare and are probably mixed with intruded ultrabasic material. Other areas have raised sediment, probably formed during the glacial recession. Often these areas have a significant gold content.

The upper portion of the channel, above plot 1, levels out and becomes ephermeral. There is little distinction between the terrestrial and riparian ecosystems. However, operations during wet season could greatly affect the area and the stream as a whole.

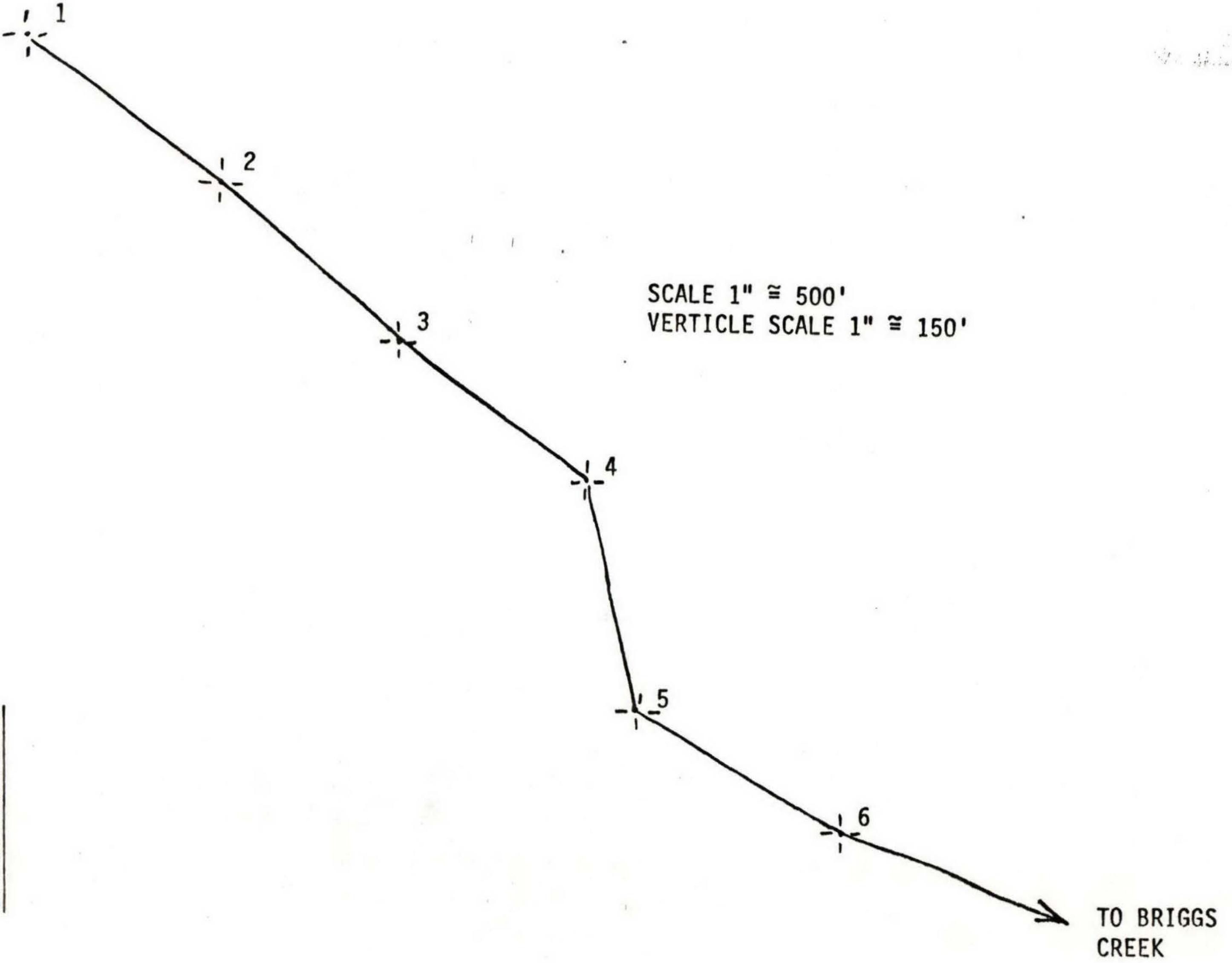
Plot 6 represents an area of accumulation. Sediment is deep and the vegetation significantly changes. This area has been recently disturbed by serious erosion, about 10 feet of accumulation has been removed in

STREAM CONDITION


South Slope
North Slope [South Side of Stream]
N
SCALE 1" ≅ 500'
1-6 Plot Nos. -.-
6
5
4
3
2
1
ASPECT of drainage direction
6
5
4
3
2
TOP
CROSS SECTION

GRADIENT

GRADIENT
By Plot Number



SCALE 1" ≅ 500'
VERTICLE SCALE 1" ≅ 150'

STREAM GRADIENT

the main channel leaving a terrace on the south side. The "Sixty Four" flood or mining or both may have been responsible for this significant loss.

HISTORY OF THE AREA

FIRE:

During the late 1800's miners commonly burned in the area to remove the vegetation. I've found many fires on the District that coincide with mining activities. White man increased the frequency above the "natural" level and changed the dominance to hardwoods, like madrone, but kept out more susceptible hardwood such as tanoak. The expected composition with such a fire regime would be heavy to madrone and Douglas-fir. However, since the early 1900's fire has been excluded by man. Thus, Douglas-fir and madrone have not been selectively favored by fires for the last 70 to 80 years. The older age classes of the Douglas-fir predate the late 1800's fires. Most are over 200-300 years. All have evidence of fire damage such as black stems and cat faces. There are also a few madrone left from the "fire era" but they occur mostly on the ridges where the fires were most likely more severe.

Patches of dead Douglas-fir where insects enjoyed a meal are present but rare. Insects were probably a factor after the fires weakened the trees and continued to break out in minor feasts occasionally.

PRESENT STANDS AND PLANT COMMUNITIES

Two distinct plant communities are present. The tanoak/Oregon grape/swordfern community and the Port-Orford-cedar/vine maple/swordfern community.

Tanoak/Oregon grape/swordfern

This community is dominated by Douglas-fir ranging from 30 to 80 percent canopy cover and tanoak completely dominating the understory where fir averages less than two percent cover. Bigleaf maple is the next most important understory plant and averages about 20% cover and occurs within the riparian system. In fact, it can be used as a marking guide to help buffer the stream. Dogwood can also reinforce the area influenced by the stream but it occurs much further upslope than maple. Yew may occur in this community but usually in the lower reaches of the stream.

The shrub layer is dominated by Oregon grape (= 40% cover) with Salal as its closest competitor (15 cover). Salal occurs on the moister sites and grape occurs quite a way upslope and peters out when the soil becomes shallow. Dwarf Oregon grape is an indicator of a good site. Trailing blackberry, Rose, hazel, red huckleberry and hairy honeysuckle are also present.

Swordfern dominates the forb layer, is unopposed and can be used along with maple to help delineate the riparian zone.

Several other herbs are present but do not develop much cover. Two that were not found on the plots but deserve mention are twinflower and Whipplevine. Twinflower will occur with Dwarf Oregon grape and indicates a good site with good surface soil conditions. Whipplevine, however, was found on the hardrock areas and commonly indicates less favorable site conditions.

There are few limitations for this community. The soil regime is excellent: good deep soils with high H_2O holding capacity, good mineral balance, excellent soil temperature regime (aspect related) etc. The above ground environment is comparable.

The average Growth Basal Area for the community (n=10) is 128±33 and Mean Annual Increment is 115±28.

Successionally the overstory is falling apart. Two to three hundred years is not biologically old for fir, but the overstory has been through several fires that have taken their toll on the stand's general health. With the decline in vigor, tanoak will come to occupy the site and assume dominance as the climax species. In addition, any cultural practice must consider tanoak's dual role as (1) a possible invader, after disturbance without fire or if burned, when the fire is not severe; and (2) a tolerant climax species.

THE PORT-ORFORD-CEDAR/VINE MAPLE/SWORDFERN COMMUNITY

Fir is the dominant overstory species in the cedar type also. However, cedar makes up about 30% of the overstory. Cedar is the only new species in the understory as compared to the tanoak type described earlier. Cedar is the dominant species and will be the dominant climax if the stand remains undisturbed. The shrubs are also similar to the tanoak type but vine maple dominates this layer with Oregon grape as its primary associate. Swordfern again is the dominant in the herb layer.

Again very few environmental limitations exist within this community. Its productive potential is much higher tan the tanoak type. GBA is approximately 397 and MAI averages 240 cubes.

Here also the overstory has been repeatedly ravaged and is on its way to a premature end. Fire is less severe on these protected sites but still takes its toll.

The community, however, is so limited in space within the sale area seperate treatment would seem unwarrented.

APPENDIX C

Fish Survey

by

Don King
Fisheries Biologist

Siskiyou National Forest
Galice Ranger Station

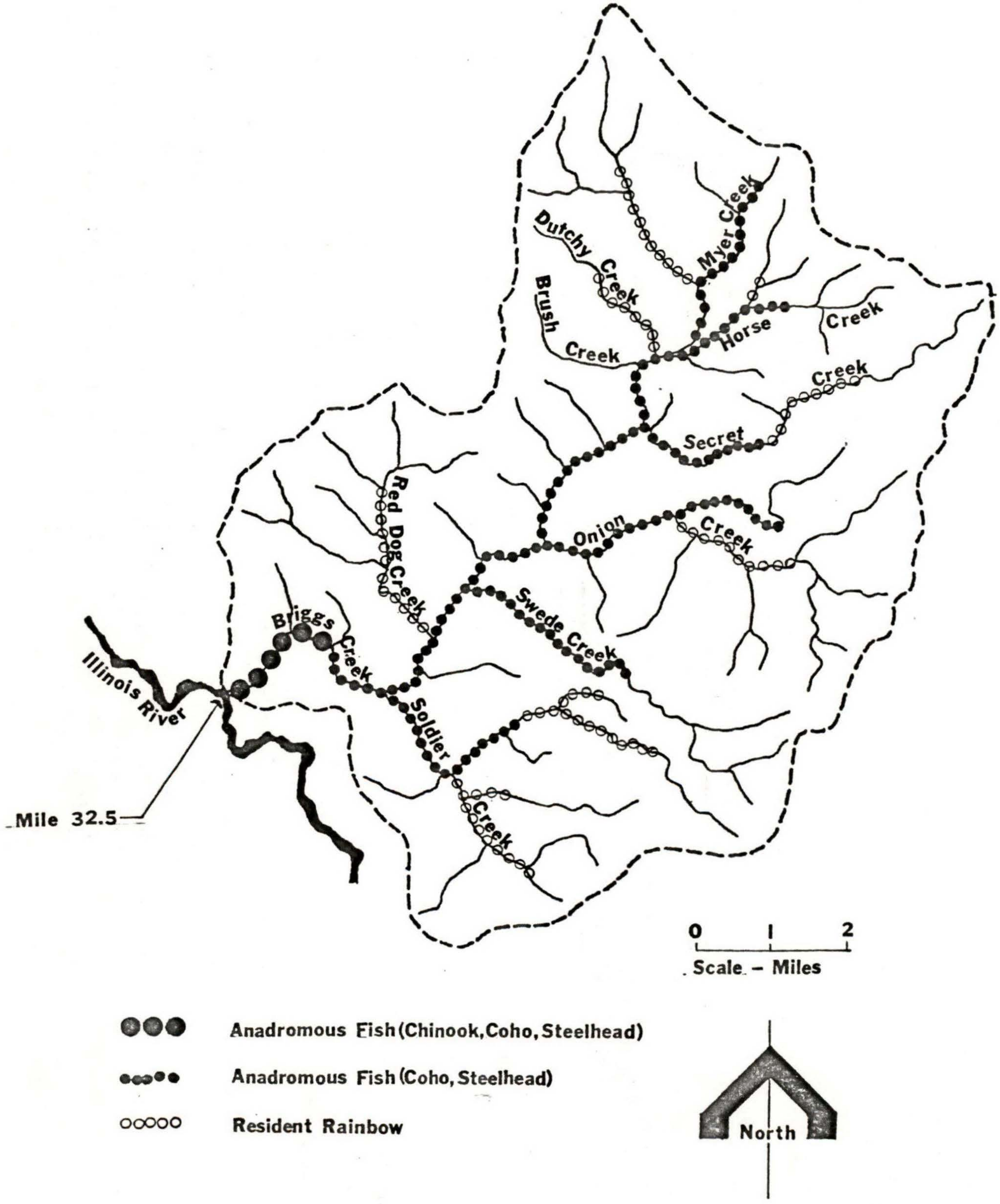
Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

The following fish population numbers for the Briggs Creek drainage were related to me by Bill Haight of the Oregon Department of Fish and Wildlife on October 1, 1980 (this is the adult spawning population). Totals = 100 Fall Chinook, 160 Coho, 1,145 Steelhead.

Briggs Creek	100	Fall Chinook salmon
	50	Coho salmon
	200	Winter steelhead
Brush Creek	10	Winter steelhead
Myers Creek	50	Winter steelhead
Secret Creek	25	Coho salmon
	75	Winter salmon
Soldier Creek	25	Coho salmon
	300	Winter steelhead
Horse Creek	200	Winter steelhead
Swede Creek	25	Coho salmon
	50	Winter steelhead
Onion Creek	25	Coho salmon
	200	Winter steelhead
Dutchy Creek	10	Winter steelhead
Horse Creek	10	Coho salmon
	50	Winter steelhead

Briggs creek habitat is also used by sea-run cutthroat trout, resident rainbow trout and resident cutthroat trout. Resident trout utilize nearly all of the Briggs Creek tributary streams in numbers of 50-75 per 100 foot section.

Briggs Creek Salmonid Distribution Map


Myer Creek
Dutchy Creek
Brush Creek
Horse Creek
Secret Creek
Red Dog Creek
Onion Creek
Swede Creek
Briggs Creek
Soldier Creek
Illinois River
Mile 32.5
0 1 2
Scale - Miles
Anadromous Fish (Chinook, Coho, Steelhead)
Anadromous Fish (Coho, Steelhead)
Resident Rainbow
North

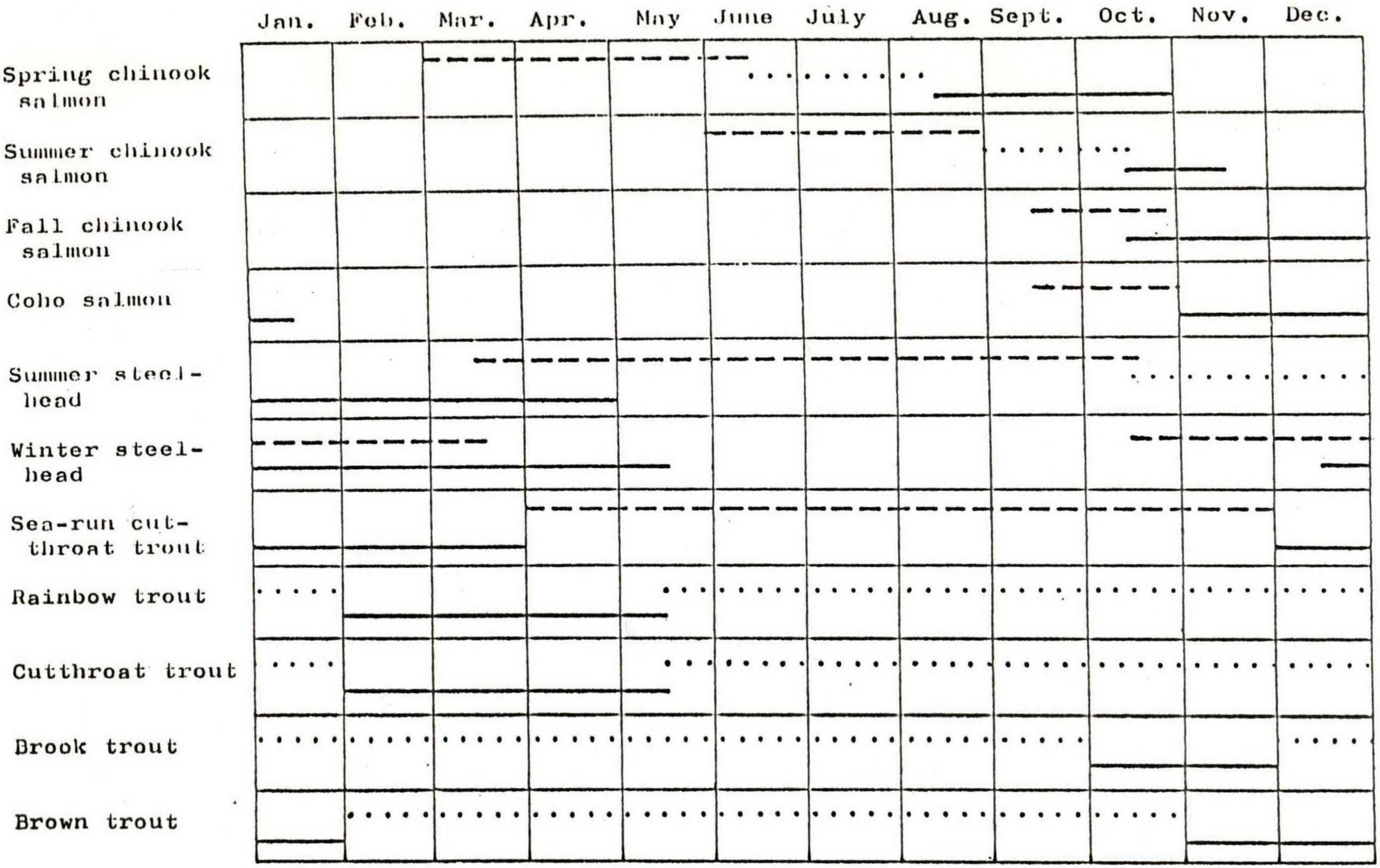


Fig. 2. Spawning and migration periodicity, Rogue Basin. Dotted lines indicate presence of adult fish in the streams. Dashed lines denote migration period. Spawning occurs when indicated by a solid line.

APPENDIX D

Wildlife Survey
by

Lee Webb
Wildlife Biologist

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

RE: Briggs Ridge Timber Sale.

On 4 February, Mel Greenup, Frank Barnhart, and I walked through Mel's "prescription unit" of the Briggs Ridge Timber Sale.

We walked up the side creek in the unit and looked at a number of the trees that will be left for wildlife (and other resources). It appears that the intent of the snag guidelines will be easily met. (2 snags per acre over time, 300 feet from perennial streams - 1 snag/acre elsewhere - which translates to 4 snags per acre and 2 snags per acre respectively ((50 year snag life span)) - at 9 acres in the unit, and if all the area is 300 feet from streams, then 36 wildlife trees are needed, big and "smaller" (4 snags x 9 acres = 36)). Large cull trees make the best snags - and they last longest. Trees that are leaning into the creek and/or holding back the banks should be left. Existing snag patches can be protected (made safe to workers) by leaving a buffer of live trees.

Mountain beaver sign was evident. Adequate protection to seedlings can probably be provided by vexar tubes.

Harvesting timber in this unit will reduce populations of flying squirrels, hermit warblers and other species of wildlife dependent on mature/old-growth forest. On the other hand, harvesting will result in added habitat diversity in the local area, with benefits to deer, quail, and many other species. I estimate ½ to 1 additional deer will be supported by the food resources which will become available in this unit (from about year 3 through 15).

I called for spotted owls continually while traversing the area. No owls responded. My guess is that no owl(s) were roosting within the unit on the 4th of February. However, it is likely that the unit is part of the range of an "unknown" owl pair in the area. We have no sighting records of any spotted owl in the immediate area, but much of the habitat here is suitable for spotted owls (medium to good). If possible, the area should be surveyed at night (after March 1, when the owls would likely be more responsive).

APPENDIX E

Guidelines for Riparian Ecosystem Management

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

TITLE 2500 - WATERSHED MANAGEMENT

2520.3 Policy - Riparian Ecosystems Management. Riparian ecosystems will be managed to maintain or improve water quality, to insure stream bank stability, to maintain habitat conditions for fish and wildlife, to reduce turbidity and channel erosion, to avoid accumulation of wood debris, and to minimize impacts resulting from management activities.

As a part of the land management planning process, stream corridors of the Siskiyou National Forest have been classified and designated as Streamside Management Units. Special management practices will be prescribed on a case-by-case basis to meet goals established for each class of stream and its associated riparian ecosystem.

The riparian ecosystem concept recognizes that all streams are important, but that some streams, because of their present or foreseeable use, should be provided a higher measure of protection than normal watershed management practice would dictate. This is particularly true on the Siskiyou where many watersheds produce an annual economic value of sport and commercial fisheries exceeding the annual value of all other resources. Accordingly, all streams on the Siskiyou deserve some level of protection.

The riparian ecosystem concept does not imply arbitrary abstention from all activities near streams, but stresses the need for applying special care in management. As a practical matter, however, if riparian ecosystem management objectives are to be met, timber harvesting and road building activity will have to be severely restricted along some streams where the potential for unacceptable impact is high.

1. Definitions

   a. Riparian Ecosystems. Riparian ecosystems are defined as streams, lakes, wet areas, and adjacent vegetative communities which are predominantly influenced by the association with water. These ecosystems support many species of wild life, large and small, and include various bird habitats. These ecosystems take their classification from the stream class.

   b. Streamside Management Unit (SMU). Streamside management units are defined as streams and adjacent areas of varying width, where practices that might affect water quality, fish, and other aquatic resources are modified, as necessary, to meet SMU goals for each class of stream. The width of this area will vary with the management goals for each class of stream, characteristics of the stream and surrounding terrain, and type and extent of planned activity. The SMU will always include at least the riparian ecosystem and in most cases will extend beyond this zone.

c. Wetlands. Wetlands are defined as those areas that are inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and manmade or natural ponds.

d. Floodplains. Floodplains are defined as the lowland and relatively flat areas joining inland and coastal waters, including, at a minimum, that area subject to one percent (100 year recurrence) or greater chance of flooding in any given year.

e. Stream. A watercourse that has perennial or intermittent flow.

f. Perennial Streams.

(1) Normally flow yearlong, except during periods of extreme drought.

(2) Have well-defined channels and show signs of washing and scouring.

g. Intermittent Streams.

(1) Carry water most of the year, but cease to flow during the dry season because evaporation and percolation into their bed and banks exceed the available flow.

(2) Have well-defined channels. Channels showing active scouring or washing are included in this category even though they may flow only during or immediately after periods of precipitation or the melting of snow.

(3) Normally lack litter, except during the fall of the year, indicating streamflow sufficient to move material during runoff.

(4) Intermittent streams do not include ephemeral streams, which are defined as follows:

(a) Carry only surface runoff and hence flow only during and immediately after periods of precipitation or the melting of snow.

(b) Form in slight depressions in the natural contour of the ground surface, but do not normally develop sufficient flow to wash or scour their channels.

(c) Can usually be identified by the presence of needles or other litter in the depressions.

2. Stream Class The present and foreseeable uses made of the water and the potential effects of onsite changes on downstream uses are the criteria for defining four stream classes. The importance of use will be relative to the general area. Consequently, size is not necessarily a criterion for classification. Whole streams or parts of streams can be classified. One stream may be sectionalized into several classes.

   a. Class I. Perennial or intermittent streams or segments thereof that have one or more of the following characteristics:

      (1) Is the direct source of water for domestic use (cities, recreation sites, etc.).

      (2) Are used by large numbers of fish for spawning, rearing, or migration.

      (3) Flow enough water to have a major influence on water quality of a Class I stream.

   b. Class II. Perennial or intermittent streams or segments thereof that have one or both of the following characteristics:

      (1) Are used by moderate though significant numbers of fish for spawning, rearing, or migration.

      (2) Flow enough water to have a moderate influence on downstream quality of a Class I or II stream.

   c. Class III. All other perennial streams or segments thereof not meeting Class I or Class II definitions.

   d. Class IV. All other intermittent streams or segments thereof not meeting Class I or Class II definitions.

3. Management Objectives Management within the riparian ecosystem will be designed to meet objectives established for each class of stream. The broad management objective for all streams is to protect the stream and adjacent environment to maintain wildlife and fish habitat, water quality, and aquatic resources at a high natural level. Specific management objectives, as itemized below, recognize that some water quality changes may inevitably occur for certain classes of streams in order to obtain the best overall yield of the many land resources.

a. Class I. The use of the water and downstream influence of such streams justify the highest level of protection and enhancement. Management activities will not degrade adjacent wildlife habitat, water quality, fish habitat, or aquatic resources below the existing or natural level measured at any point, except for temporary changes resulting from:

(1) Activities designed to improve the stream, e.g., restoration and habitat improvement.

(2) Necessary road crossing, e.g., bridges, culverts.

(3) Structures associated with putting the water to other beneficial uses, e.g., irrigation diversions, domestic supply intakes.

Temporary changes are those which usually last less than one day. In any event, changes as a result of these activities must be minimal. Adjacent wildlife habitat refers to that habitat within a minimum of 100 feet, horizontal distance, from mean high water mark on each side of the stream.

b. Class II. The use of the water and downstream influence of such streams justify a high level of protection and enhancement. Management activities will not deteriorate wildlife habitat or degrade water quality below existing state and federal water quality standards measured at any point, except for any unavoidable temporary changes that might deteriorate water quality below the standards for a short period of time and exception listed for Class I.

Temporary changes are those which usually last less than one day and do not include:

(1) Water temperature increases which take a minimum of several years to return to normal, or

(2) Turbidity increases from long-term disturbances such as roads or large denuded areas that act as a recurring source for a long period of time until stabilization is achieved.

A temporary change is unavoidable only when there is no reasonable alternative.

c. Class III. The minor onsite use and downstream influence of such streams justifies a moderate level of protection. Management activities will not deteriorate water quality below existing state and federal water quality standards as measured at the first downstream point where a beneficial use occurs, except for temporary changes provided for in Class I and II streams. Wildlife habitat adjacent to the streams must also receive recognition and shall be given a moderate level of protection.

d. Class IV. The absence of onsite use of the water and minor influence downstream justifies a moderate level of protection. Management activities will not deteriorate water quality below existing state and federal water quality standards as measured at the first downstream point where a beneficial use occurs, except for temporary changes provided for in Class I and II streams.

4. Management Requirements and Constraints The best land management practices should be used on all streams, even those in lower classes. The following minimum acceptable practices will normally be necessary to achieve management goals. District Rangers should recommend in the Environmental Assessment more stringent protection measures for a specific stream to compensate for unique resource or management situations. Particular sensitivity and professionalism is needed in classifying stream courses and in establishing the appropriate limits of individual stream course riparian ecosystems and streamside management units. Additional references are: FSM 2203, 2456.5, 2482.2, 2522.11, 2630, and FSH 7709.11, Guides D-4 and D-5.

a. Class I and II Riparian Ecosystems.

(1) Maintain the micro-climate of the riparian ecotype by not removing more than 20 percent of its overstory canopy. Maintaining the acceptable minimum level must be accomplished along the entire stream. In other words, total removal in one section is not balanced by no removal in another.

(2) The protected area must consist of a minimum of a 100-foot horizontal distance on both sides of the stream (measured from mean high water level).

(3) No log yarding is permissible across a Class I or II stream without specific site evaluation, on-the-ground review by the appropriate line officer, and full documentation in the Environmental Assessment. Predicted impacts from proposed skyline anchors and corridors must be included in every riparian ecosystem prescription involving cable systems. Full suspension of logs is required.

(4) Roads should normally be located in a manner that restricts entry into the area, 100-foot horizontal distance on either side of these streams. Crossings should be limited to those where no practical alternative is available. All roads and structures in this zone must be constructed and maintained so that sediment and woody debris will not enter the stream. Bridges or open bottom culverts are preferred. Special recognition of the spawning cycle for anadromous fish is necessary. Extra care should be taken to keep equipment out of the stream channel and drastically limited in the adjacent 100-foot zone. To insure that impacts are minor; limit construction activities (bridges, culverts, etc.) in the stream to short construction periods on a seasonal basis and utilize special installations (e.g., sediment traps, settling ponds, coffer dams, etc.) to keep sediment from reaching the stream.

(5) Every effort must be made to prevent man-caused woody debris from entering the stream channel. Removal time of 48 hours under the Timber Sale Contract "B" provision will be required. Removal of existing stable woody debris shall be done only in cases where fish migration is blocked, water quality impaired, or excessive erosion is occurring as a result of the debris, and only with site specific input from a hydrologist or fishery biologist. Exceptions to this policy must be supported by the Environmental Assessment which has specifically analyzed the encroachment. The Environmental Assessment will describe alternatives to the proposed action and the environmental consequences of such alternatives.

(6) Livestock grazing should be restricted to light use by management practices such as deferred use, rest rotation, or exclusion by fencing.

(7) Each District Ranger is responsible to mitigate the impacts of past management practices that continue to degrade the riparian ecosystem. The environmental assessment of each proposed project will include proposals to rehabilitate these problem areas. If the site of continuing degradation cannot logically be included within a project area, then it will be scheduled for corrective work in the annual programs.

b. Class III Riparian Ecosystem.

(1) All Class III streams within any proposed timber harvest or road construction area will be given specific individual analysis by the interdisciplinary process as part of the Environmental Assessment for the project. Manage the timber stands within 50 feet of the stream course, recognizing that riparian ecosystem values must receive full consideration in the silviculture prescription in this zone. Partial conifer removal is generally appropriate for this area, as is total hardwood retention. The width of this zone should be site specifically determined by the I.D. team.

(2) Minimize impacts on riparian vegetation and protect the integrity of stream banks. Recognize sensitive soil conditions adjacent to these streams and adjust treatment intensities to minimize siltation.

(3) Projected stream temperature which may increase above 58° F as a result of riparian ecosystem treatments must be specifically analyzed in the Environmental Assessment. The analysis must examine the cumulative effects of both past and projected future treatments.

(4) Where logging across Class III streams is projected, logs must be flown clear of the stream course and generally clear of riparian vegetation (full suspension).

(5) Man-caused woody debris and road construction material must not be allowed to enter the stream channel. Removal time of 48 hours under the Timber Sale Contract "B" provision will be required.

(6) Special road fill slope stabilization measures are prudent and appropriate road investments to protect stream values and should be used where appropriate.

(7) Each District Ranger is responsible to mitigate the impacts of past management practices that continue to degrade the riparian ecosystem. The environmental assessment of each proposed project will include proposals to rehabilitate these problem areas. If the site of continuing degradation cannot logically be included within a project area, then it will be scheduled for corrective work in the annual programs.

c. Class IV Riparian Ecosystem.

(1) Environmental Assessment analysis that anticipates disturbance will insure that such the disturbance will not be detrimental to a higher class stream. Consider the impacts of cutting immediately adjacent to the channel, debris in the channel, and adjacent soil stability impacts from slash disposal methods and clearcut activities.

(2) Recognize areas where resource sensitivities indicate the need for partial or full suspension of logs.

(3) Most Class IV stream course protection needs can be met with hardwood and conifer retention directly adjacent to the stream channel, but occasional side slope mitigation measures may be necessary on very steep and/or unstable terrain.

APPENDIX F

Management Requirements, Constraints and Mitigating Measures for the

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

Management Requirements, Constraints and Mitigating Measures for the

BRIGGS RIDGE Timber Sale

Applies to:						
Alt No.	Cutting Unit #	Item	Description	Person Responsible	Due Date	Item Complet
1,2	1,2,3,4 & 5	Streamcourse Protection ✓ *	Meet Siskiyou Riparian Habitat Guidelines. An SMU of variable width will be designated along Briggs Creek. Harvest units will be posted no closer than 50' from the Briggs Creek Trail, variable to fit topography (Units 1-4).	Pre-Sale Forester	During Layout	
1,2	"	"	No trees within 100' of Briggs Creek in subdivisions 1,2,3,4 & 5 will be marked for cutting (this may exceed 100' where necessary to fit topography).	"	"	
1,2	"	" * ✓	Directional falling of trees adjacent the Class III stream in subdivision 1 & 4 & along the bottom of all units above Briggs Creek, will be specified in the contract, on Sale Area Map & appraised for as necessary (C6.41). Require directional falling of any trees which might fall into the SMU's specified above.	"	"	
1,2	"	"	A comprehensive plan will be prepared for future management of streamside riparian zones which are outside proposed harvest units. This plan will address recreation, timber, wildlife, soils, watershed and any existing and/or projected resource need. (This will include an actual marking prescription for uneven aged management for the timber resource).	T.M.A.	After publication of Forest Plan	
1,2	4	" ✓ *	There will be a no-burn area within 100' on each side of the Class III stream in Unit 4. A silvicultural prescription will be developed for marking each side of the stream.	"	"	
1,2	All	" ✓ *	Monitor stream quality in Briggs Creek before, during & after logging.	District Hydrologist	Pre-Sale During & After Logging	

Management Requirements, Constraints and Mitigating Measures for the

BRIGGS RIDGE Timber Sale

Applies to: Alt No.	Cutting Unit #	Item	Description	Person Responsible	Due Date	Item Complet
1,2	All	Wildlife ✓✱	Meet Forest Snag guidelines by ensuring that 2-3 potential & existing snags per acre will remain on areas cutover. Include LDS (Leave Dead Trees Standing) in timber sale contract to preserve snags outside harvest units. Purchaser may fall those that are safety hazards & fire control to appraise those to fall for fire danger.	Pre-Sale Forester TMA & FMO	During Layout	
1,2	1,2,3,4, & 5	Transportation	Establish survey & design long-term roads for constant use into subdivisions 1 through 5.	Project Engineer	During Layout	
1,2	"	"	Ensure contract properly prepared to obtain designed road construction	"	During Appraisal & Contract Prep.	
1,2	"	"	Obtain contract compliance during construction.	"	During Road Construction	
1,2	"	"	Close off the Elkhorn Mine Road (jeep trail) where the new road crosses it.	"	"	
1,2	"	"	To minimize erosion, all road construction begun in one season must be completed in the same season, including surface rock. Season will run from June 15 - October 15.	"	"	
1,2	"	"	Develop rockpit development & rehabilitation plan for sale. Plan for using pit-run rock on all new constructed roads. Road "E" will be surfaced from a pit on the Flat Top Rd. #3603, while Road "A" will be surfaced from a pit along Secret Cr. Rd. #3694P. Also some rock may be available from excavated landings.	"	During Rd Design Stage	
1,2	"	Mining	Notify claimants along Briggs Creek of proposed action.	O.R.A.	During Layout	

Management Requirements, Constraints and Mitigating Measures for the

BRIGGS RIDGE Timber Sale

Applies to:						
Alt No.	Cutting Unit #	Item	Description	Person Responsible	Due Date	Item Comple
1,2	1 & 2	Logging	Landings for Units 1 & 2 to be constructed to minimum useable size for large yarding equipment. Plan for square lead to minimize width, and result in a maximum of 45-50 feet of cutbank. Contract provision C6.422, Landing Construction Critical, to be utilized to ensure construction without sidecast. Or construct with compacted fill for extra width & lower cutbank if engineering design shows this to be feasible. A specification will be developed to define & require acceptable fill material to avoid use of any soils likely to erode and be easily transported downhill into the streams.	T.M.A.	During Contract Prep.	
1, 2	2,3 & 4	"	Any stumps in close proximity to the trail (seen from) should be cut as low as practical.	T.M.A. S.A.	" During Tbr. Sale	
1,2	All	"	* ✓ Require one-end suspension of logs in-haul within units & full-end suspension over protected streamcourses & any trees removed in skyline corridors over Briggs Creek.	T.M.A.	During Contract Prep.	
1,2	"	"	✓* Enforce above requirement.	S.A.	During Logging	
1,2	"	"	Loggers will post trail closed for logging while cables are strung across units adjacent to the trail. The Forest Service will notify miners of action.	"	"	
1,2	"	"	✓* Develop wording for C6.422 to require minimum width corridor thru SMU's & carriage capable of lateral yarding up to 100 feet.	Logging Specialist	During Contract	

Management Requirements, Constraints and Mitigating Measures for the

BRIGGS RIDGE Timber Sale

Applies to:						
Alt No.	Cutting Unit #	Item	Description	Person Responsible	Due Date	Item Complet
1,2	All	Slash Disposal	Landing slash (incl. PUM) must be end-hauled due to lack of piling room in all units.	F.M.O.	Pre-Sale Stage	
1,2	"	"	Designate adequate end-haul sites as disposal areas.	"	"	
1,2	"	"	Ensure adequate appraisal allowances are made for end-haul requirements & contract specifications are prepared to gain contract compliance.	"	"	
1,2	"	"	Ensure slash disposal specifications & contract requirements are met by Purchaser.	S.A.	During Active Logging	
1,2	4	" ✓*	There will be a 100' no-burn buffer on each side of the Class III stream in Unit #4. All tops will be pulled out of the buffer zone.	F.M.O.	During B.D. Activities	
1,2	All	K-V Deposits	Make K-V collections in SAI Plan for the following items discussed in the EA work-up detailed plans & cost allowances:	O.R.A.	Pre-Sale Stage	
1,2	"	"	Slope revegetation on cutbanks & fill slopes on road. Follow-up fertilization & tree planting. Conduct a vegetation survey following planting.	"	"	
1,2	N/A	"	Plan, program & conduct a streamcourse survey for Briggs Creek for possible K-V fish, wildlife & recreation enhancement projects.	O.R.A. Fisheries Biologist	Report by Oct. 1981	
1,2	"	"	Re-barrier old Elkhorn Mine road. Re-seed & fertilize by hand with K-V funds.	O.R.A.	Post-Sale Stage	

Management Requirements, Constraints and Mitigating Measures for the

Briggs Ridge Timber Sale

Applies to:						
Alt No.	Cutting Unit #	Item	Description	Person Responsible	Due Date	Item Complet
1,2	All	Accountability *	Interdisciplinary team (RDMA) will visit & review sale area after completion of logging, brush disposal & reforestation activities.	District Ranger	After Completio	
1,2	4	Recreation	Protect the big Douglas-fir tree on the flat between Units 3 & 4. Designate as protected tree.	T.M.A. & Project Engineer	During All Phases of Sale Activity	

*REQUIREMENTS FOR RIPARIAN ZONE MANAGEMENT

APPENDIX G

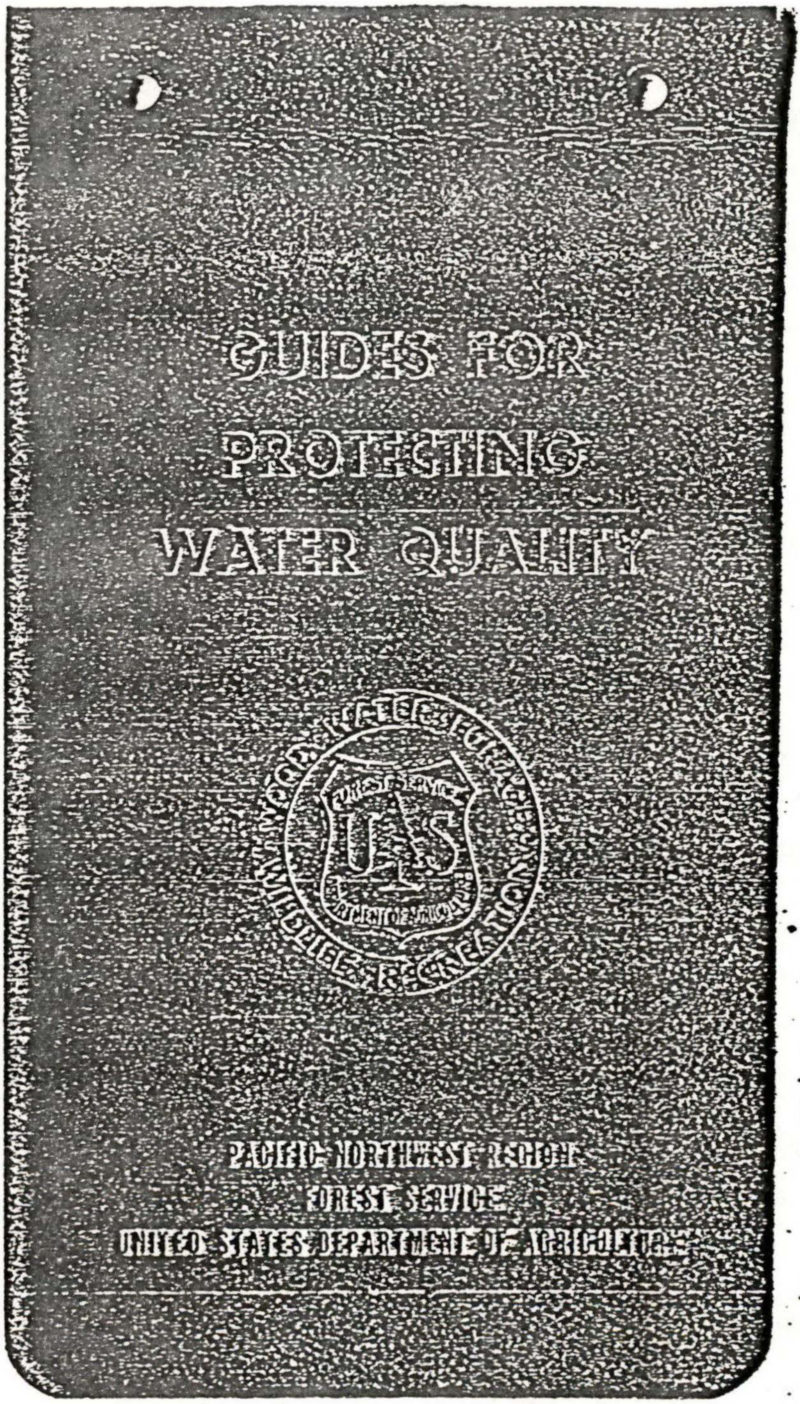
Water Temperature Calculations
by

Mel Greenup Forest Silviculturist
Bill Hansen District Hydrologist

January 22, 1981

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream



GUIDES FOR
PROTECTING
WATER QUALITY

PACIFIC NORTHWEST REGION
FOREST SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

PREDICTING WATER TEMPERATURE INCREASES

Reference: Brown, George W., 1970. Predicting the Effect of Clearcutting on Stream Temperature. Journal of Soil and Water Conservation. 25(1):11-13.

Temperature Increase Formula

Increases in water temperature can be estimated by the formula:

$$\Delta T = \frac{A \times H}{D} \times .000267 \text{ where:}$$

ΔT = predicted change in temperature (°F)
A = surface area of stream exposed in square feet (length × width)
D = discharge in cubic feet per second
H = amount of heat absorbed in British thermal units per square foot per minute
$.000267$ = constant converting discharge to pounds of water per minute

Mixing Ratio Formula

The above formula can be used to predict what increase might occur on the site. What impact such increases might have downstream can be predicted by the following mixing ratio formula:

$$T = \frac{Dm\ Tm + Dt\ Tt}{Dm + Dt} \text{ where}$$

T = temperature of the main stem after the tributary enters
Dm = discharge of main stem before tributary enters
Dt = discharge of tributary
Tm = temperature of main stem before tributary enters
Tt = temperature of tributary

Percent of Increase in Direct Solar Radiation and Changes Created:

Worse Case Estimate (Clearcut + Broadcast Burn):

$$\Delta T = \frac{A \ X \ H}{D} \ X \ .000267 \ X \ .85 \qquad A = 2150 \ X \ .5 = 1075 \ A^2$$

$$D = .1 \text{ cfs}$$

$$H = 4.4$$

$$\Delta T = \frac{1075 \ X \ 4.4}{.1} \ X \ .000267 \ X \ .85 = \underline{\underline{10.7° \ F}}$$

Mixing Ratio (Effect on Briggs Creek Temperature)

$$T = \frac{Dm \ Tm + Dt \ Tt}{Dm + Dt} \qquad \begin{array}{ll} Dm = 10\text{cfs} & Tm = 66° \\ Dt = .1\text{cfs} & Tt = 58° \end{array}$$

$$= \frac{10 \ X \ 66 + .1 \ X \ (51 + 10.7)}{10 + .1} = \underline{\underline{66°}}$$

Vegetation Untreated:

$$\Delta T = \frac{1075 \times 4.4}{.1} \times .000267 \times .53 = 6.7^\circ$$

Mixing Ratio

$$T = \frac{10 \times 66 + (.1 \times 51 + 6.7)}{10 + .1} = 65.9^\circ \text{ (No effect)}$$

Vegetation Treatment:

$$\Delta T = \frac{1075 \times 4.4 \times .000267 \times .6}{.1} = \underline{\underline{7.6^\circ}}$$

Mixing Ratio:

$$\frac{10 \times 66 + (.1 \times 51 + 7.6}{10.1} = \underline{\underline{65.9^\circ}} \text{ (No effect)}$$

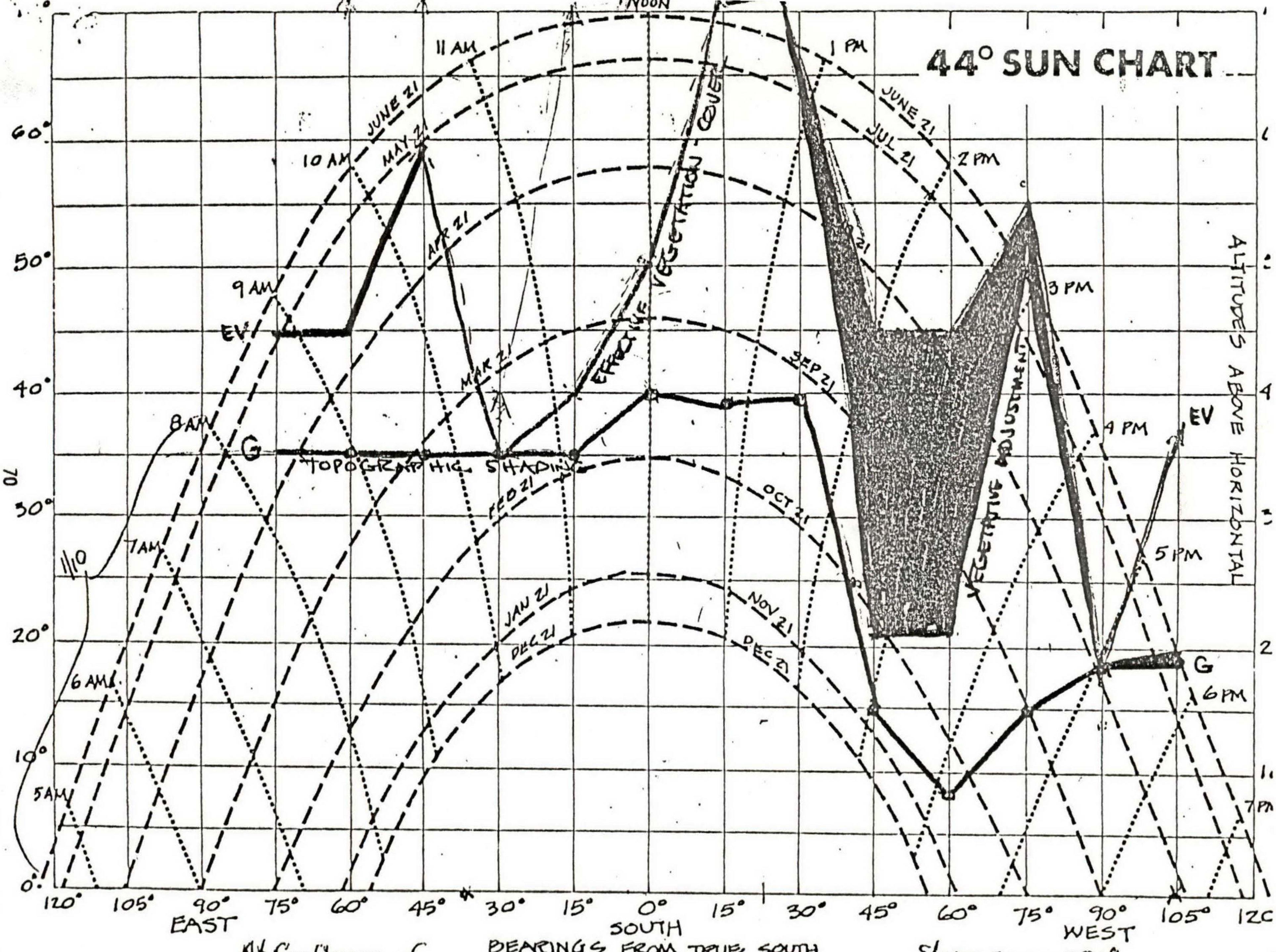
Plot No. 5: (Vegetation Treatment)

Effect on tributary:

$$\Delta T = \frac{1075 \times 4.4 \times .000267 \times .64}{.1} = \underline{\underline{8.1^\circ}}$$

Mixing Ratio:

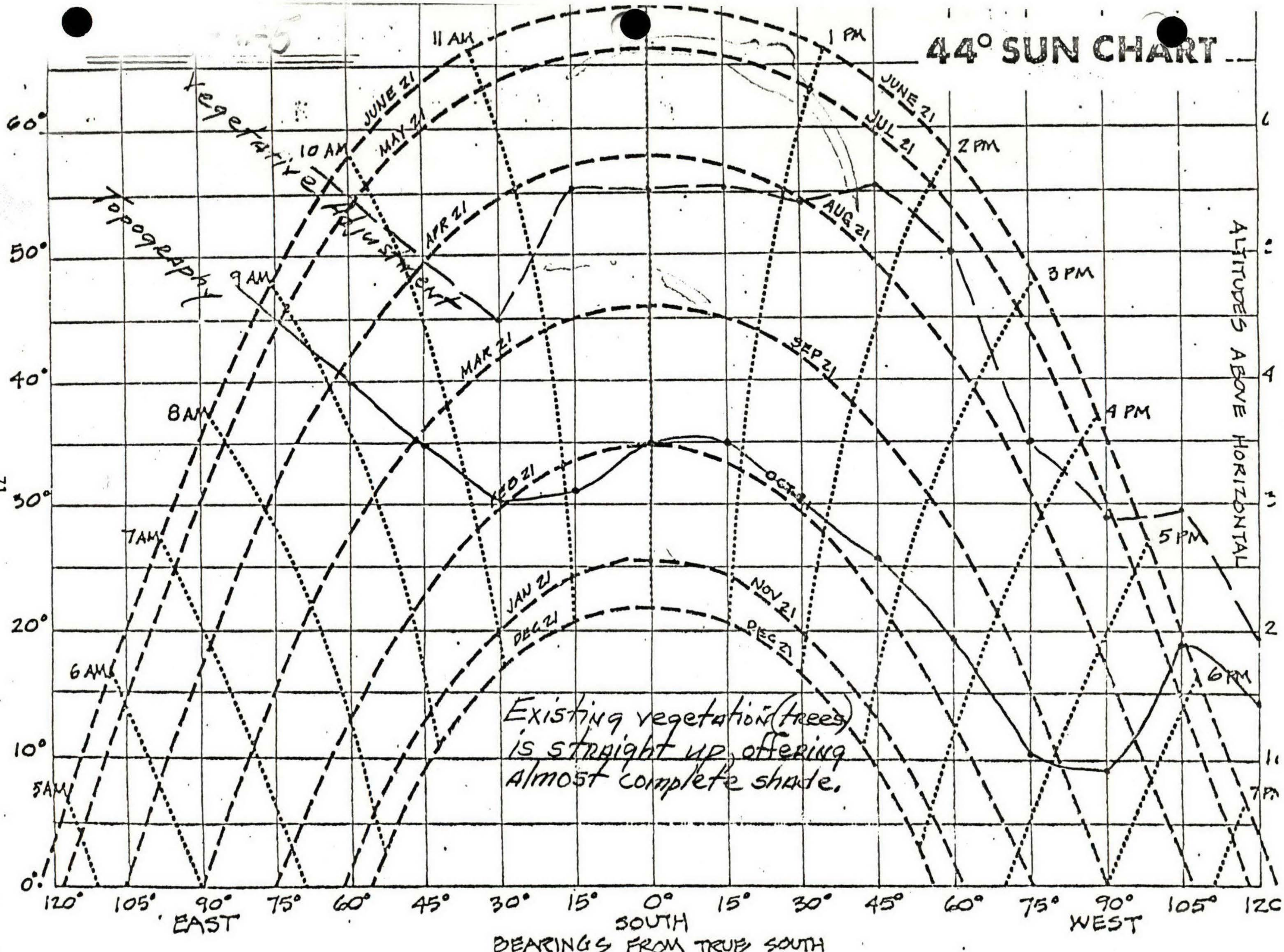
$$T = \frac{10 \times 66 + .1}{10 + .1} (51 + 8.1) = 65.9^\circ \text{ (No effect)}$$



At Confluence of two streams

Stream course 290°

44° SUN CHART



Existing vegetation (trees) is straight up, offering almost complete shade.

Stream Runs 310°

APPENDIX H

Economic Analysis of Alternatives C and D

by

Mel Greenup
Forest Silviculturist

February 1981

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

Economic Analysis of Alternatives C and D
Briggs Ridge Riparian Ecosystem

Assumptions

1. Costs of planting, animal damage control, release and precommercial thinning are the same for all regimes.

2. Yield projections were made by adjusting a DFIT run with GBA for basal area and trees per acre and using the adjusted figures in the R6 Managed Yield Table (MGYLD5).

3. Site Index is 170.

4. Rotation age is 90 years.

5. Interest Rate is 5%.

6. Timber values are assumed to increase at the rate of 2% through the rotation.

7. Present value of final harvest timber is \$500/MBF.
   Present value of commercially thinned timber is \$200/MBF.

8. District experienced per acre costs:

Hand Pile and Burn	\$330
Plant	335
Animal Damage	156
Manual Release	400
Precommercial Thinning	214

9. Soil Expectation Value Formula:

$$SEV = \frac{\text{Total Benefits Compounded to Rotation - Total Costs Compounded to Rotation}}{(1 + i)^r - 1}$$

Benefits from initial harvest are not included in this calculation.

ALTERNATIVE C

COSTS $

YEAR	TREATMENT	COST/ACRE	ADJUSTMENT FACTOR	DISCOUNTED COST	COST COMPOUNDED TO ROTATION
0	Pile and Burn	330	--	330	26,641
1	Plant	335	1.05	319	25,757
2	An. Dam. Control	156	1.10	142	11,423
3	Manual Release	400	1.16	345	27,895
15	Precommercial Thinning	214	2.08	103	8,310
TOTALS				1,239	100,026

REVENUES $

YEAR	TREATMENT	VALUE PER MBF	VOLUME PER ACRE	PER ACRE REVENUE	ADJUSTMENT FACTOR	DISCOUNTED REVENUE	COMPOUNDED REVENUE TO ROTATION
0	Clearcut	500	53.0	26,500	--	26,500	--
45	Thin	488	7.6	3,709	8.99	413	33,325
65	Thin	725	10.4	7,540	23.84	316	25,533
90	Harvest	2,972	45.3	134,632	80.73	1,668	134,632
TOTALS						28,897	193,490

	DISCOUNTED	COMPOUNDED
Total Revenues	28,897	193,490
Total Costs	1,239	100,026
Present Net Worth	27,658	
Benefit/Cost Ratio		1.93
Soil Expectation Value		1172

ALTERNATIVE D

COSTS $

YEAR	TREATMENT	COST/ACRE	ADJUSTMENT FACTOR	DISCOUNTED COST	COST COMPOUNDED TO ROTATION
0	Pile and Burn	330	--	330	26,641
1	Plant	335	1.05	319	25,757
2	An. Dam. Control	156	1.10	142	11,423
3	Manual Release	400	1.16	345	27,895
15	Precommercial Thinning	214	2.08	103	8,310
TOTALS				1,239	100,026

REVENUES $

YEAR	TREATMENT	VALUE PER MBF	VOLUME PER ACRE	PER ACRE REVENUE	ADJUSTMENT FACTOR	DISCOUNTED REVENUE	COMPOUNDED REVENUE TO ROTATION
0	Partial Cut	500	22.4	11,200	--	11,200	--
90	Partial Cut	2,972	22.8	67,762	80.73	839	67,762
TOTALS						12,039	67,762

	DISCOUNTED	COMPOUNDED
Total Revenues	12,039	67,762
Total Costs	1,239	100,026
Present Net Worth	10,800	
Benefit/Cost Ratio		.67
Soil Expectation Value		- 404

APPENDIX I

Field Review
by

Frank Barnhart
Logging Specialist

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

Field Review of U-4 Briggs Ridge
Galice R. D. - Greenup - Webb - Barnhart

Observations and Comments on the above trip:

1. OBS. The proposed identification of the riparian zone boundary by vegetation indicator is better than any method I have seen to date.

2. CMT. Tree selection for cutting based on slope stability is not going to be easy to describe. An element of expertise is essential even with a well developed written guide. Pictures showing typical examples offers the best hope of passing the grade with semi and unskilled help.

3. CMT. The boundary of the SMU should be moved up away from the creek 100' further for the rub tree buffer zone. All trees designated in this area are to be cut and yarded after falling and yarding rest of clearcut is complete. (Purpose is to keep finished corridors narrow through SMU.)

4. CMT. All designated trees within the SMU boundary standing on slopes 65% + and/or on slope breaks that break to 65% + into the stream without any benches, should be lined and "restrained." (This will require R.O. revised contract language.) Windfalls in the way, should have rigging cuts and be pulled into lead with the designated trees, in order to minimize soil disturbance and breakage. These two refinements to lining would prevent 99% of the stream side impact from falling and skyline yarding.

5. CMT. The landing in U-4 should be west of the upper end of the draw we walked up, in the vicinity of where we discussed. This will offer maximum stream protection potential from best possible deflection opportunity.

APPENDIX J

Debris Modeling Program
for

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

```
                                                   DEBRIS POTENTIAL IN TONS PER ACRE FOR..          2/06/81
  REGION 6   FOREST SISKIYOU                    DISTRICT  2  EXAM NO.  360   OUTPUT OPTION 1   GIRARD TOP
                +----------------------+ +----------------------+ +----------------------+ +----------------------+ +----------------------+
  SPECIES -> +       DOUGLAS-FIR       + +       MADRONE        + +        TANOAK        + +  WESTERN REDCEDAR    + +    PONDEROSA PINE    +
                +----------------------+ +----------------------+ +----------------------+ +----------------------+ +----------------------+
                + CROWNS,TOPS + +      + + CROWNS,TOPS + +      + + CROWNS,TOPS + +      + + CROWNS,TOPS + +      + + CROWNS,TOPS + +      +
  DEBRIS---> +  <3     3,>3 + +CULLS+ +  <3     3,>3 + +CULLS+ +  <3     3,>3 + +CULLS+ +  <3     3,>3 + +CULLS+ +  <3     3,>3 + +CULLS+
 DBH GROUP      +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+
  1.0- 1.9        .00      .00      .00      .00      .00      .00      .33      .00      .00      .00      .00      .00      .00      .00      .00
  2.0- 2.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
  3.0- 3.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
  4.0- 4.9        .00      .00      .00      .00      .00      .00      .99      .43      .00      .00      .00      .00      .00      .00      .00
  5.0- 5.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
  6.0- 6.9        .00      .00      .00      .79     2.00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
  7.0- 7.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
  8.0- 8.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
  9.0-10.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 11.0-12.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 13.0-14.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 15.0-16.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 17.0-18.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 19.0-24.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 25.0-29.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 30.0-39.9        .44      .33      .23      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 40.0-49.9       2.25     1.93     5.87      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 50.0-59.9       3.88     4.35    13.56      .00      .00      .00      .00      .00      .00      .36      .17      .00      .00      .00      .00
 60.0+            .48      .45     4.24      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
               -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------
    TOTAL        7.04     7.06    23.89      .79     2.00      .00     1.32      .43      .00      .36      .17      .00      .00      .00      .00

                +----------------------+ +----------------------+ +----------------------+ +----------------------+ +----------------------+
  SPECIES--> +    LODGEPOLE PINE      + +    WESTERN LARCH     + +      GRAND FIR       + +    OTHER SPECIES     + +     ALL SPECIES      +
                +----------------------+ +----------------------+ +----------------------+ +----------------------+ +----------------------+
                + CROWNS,TOPS + +      + + CROWNS,TOPS + +      + + CROWNS,TOPS + +      + + CROWNS,TOPS + +      + + CROWNS,TOPS + +      +
  DEBRIS---> +  <3     3,>3 + +CULLS+ +  <3     3,>3 + +CULLS+ +  <3     3,>3 + +CULLS+ +  <3     3,>3 + +CULLS+ +  <3     3,>3 + +CULLS+
 DBH GROUP      +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+
  1.0- 1.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .33      .00      .00
  2.0- 2.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
  3.0- 3.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
  4.0- 4.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .99      .43      .00
  5.0- 5.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
  6.0- 6.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .79     2.00      .00
  7.0- 7.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
  8.0- 8.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
  9.0-10.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 11.0-12.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 13.0-14.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 15.0-16.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 17.0-18.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 19.0-24.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 25.0-29.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
 30.0-39.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .44      .33      .23
 40.0-49.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00     2.25     1.93     5.87
 50.0-59.9        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00     4.24     4.52    13.56
 60.0+            .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00      .48      .45     4.24
```

This program was run with stand exam data showing 8 TPA. This was changed to 13 TPA as a result of a 100% tree count in the SMU. These trees average 46" DBH and have a residue weight of 2,030 pounds per tree for a total additional weight of 5X2030 = 10150=5.1 tons/acre

Therefore, the maximum potential fuel loading (if clearcut) will be: 7.04+7.06+23.89+5.1=43.09 tons per acre.

With the prescription selected, 8 TPA will be retained (not harvested) Therefore, the resulting estimated fuel loading will be 43.09-(8X2030 or 8.12 tons/acre)= 35 tons per acre.

*About 10 tons per acre will be removed by YUM yarding. −10

25 =Net fuel loading after logging.

*Estimated by Galice Fuels Technician Christ Gibson

APPENDIX K

Stand Exam Printout
for

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

STAND ANALYSIS TABLES
R6 TSE SYSTEM VERSION AFV2-380
COMPARTMENT NAME. GRANITE COMP. NO. 2308 CELL NOS.
X-REF COMP. NOS. X-REF CELL NOS.
SISKIYOU NATIONAL FOREST RANGER DISTRICT 2 EXAM NO. 360 RUN DATE 2/ 6/81

TABLE A. STAND EXAMINATION SUMMARY

** STAND CONSTANTS **		COMPUTED STAND CHARACTERISTICS		OTHER STAND CHARACTERISTICS		** 16 FOOT FORM CLASSES **	
CROP AGE	95	MAJOR SPECIES (ALL TREES)	0	✓ SITE INDEX	170	SPECIES 205	FORM CLASS 75
STOCKING LEVEL CURVE SPECIES	205	MAJOR SPECIES (CROP TREES)	631	✓ SITE INDEX SPECIES	205	SPECIES 0	FORM CLASS 0
SITE CLASS	2	STAND AGE (CROP TREES)	1	ECOCLASS		SPECIES 0	FORM CLASS 0
BASAL AREA FACTOR	40	PERCENT STOCKING		FORMATION		SPECIES 0	FORM CLASS 0
FIXED PLOT AREA	1/250 ACRE	CROP TREES	60.66	SERIES		SPECIES 0	FORM CLASS 0
NUMBER OF POINTS	7	EXCESS TREES	19.06	COMMUNITY		SPECIES 0	FORM CLASS 0
VOLUME CALC. METHOD	1	MATURE TREES	12.82	MIDPOINT ELEVATION	2400	SPECIES 0	FORM CLASS 0
SPECIFIED TOP DIB (BF)	0	CULL TREES	8.93	EXAM DATE	1/81	SPECIES 0	FORM CLASS 0
		ALL LIVE TREES	101.47				

** POPULATION PARAMETER ESTIMATES **

	GROSS VOLUME/ACRE		BASAL AREA/ACRE(5.0+) VARIABLE PLOTS			TREES PER ACRE VARIABLE PLOTS			TREES PER ACRE FIXED PLOT		
	BF	CF	SQ.FT.	CV PCT.	SE PCT.	NO.	CV PCT.	SE PCT.	NO.	CV PCT.	SE PCT.
MATURE	34212	5481.2	~~102.9~~ 147.0	59.	22.2	~~7.69~~ 13	52.	19.5	.00	0.	.0
IMMATURE	0	71.3	5.7	265.	100.0	29.10	265.	100.0	321.39	107.	40.6
(CROP)	0	71.3	5.7			29.10			235.61		
(EXCESS)	0	.0	.0			.00			85.78		
LIVE SOUND	~~34212~~ 75660	5552.5	~~108.6~~ 152.7	55.	20.8	~~36.79~~ 42	211.	79.9	321.39	107.	40.6
CULL		.0									

* * SAMPLE ESTIMATE QUALIFICATION * *

1. SIMPLE RANDOM SAMPLE ( )
2. SYSTEMATIC SAMPLE (✓)
3. SUBJECTIVE SAMPLE ( )

This stand exam does not correctly reflect mature DBH, TPA, BA and gross volume per acre. This is based on a 100% tree tally and the fact that TPA SE PCT. is quite high (80%). These elements were recomputed and changes made accordingly.

Net vol./ac = 75660 X .70 = 53 Mbd. ft.

Estimated defect + breakage = 30%

TREATMENT(S) PRESCRIBED FOR THIS STAND-

DATE- BY-
NEXT EXAM SHOULD BE GIVEN-

* * * * TRI SYSTEM STAND DATA * * * *

TRCL	MASP	MISP	AVDBH	DIST	TPA	BA/A	MBF/A	YEARD	MIST	DAMAG
M	DF	PC	46		13	147	76	1700		
C	T	PC	3		265	6				
E	T		1							
X	DW				36					
D										

} Immature

```
                              COMPARTMENT NAME.   GRANITE                 COMP. NO.  2308        CELL NOS.
                                                                      X-REF COMP. NOS.         X-REF CELL NOS.
      SISKIYOU NATIONAL FOREST    RANGER DISTRICT   2  EXAM NO. 360   RUN DATE  2/ 6/81


 TABLE B.  ESTIMATED NUMBER OF TREES PER ACRE ON EACH POINT BY TREE CLASS

           POINT      CROP       EXCESS     MATURE    LIVE SOUND      CULL     ALL LIVE    SALVABLE DEAD   UNMERCH DEAD
            NO         TPA        TPA        TPA         TPA          TPA        TPA            TPA            TPA


             1        35.71        .00       1.65       37.36          .00       37.36          .00            .00
             2        35.71        .00        .29       36.00          .00       36.00          .00            .00
             3          .00        .00        .84         .84          .00         .84          .00            .00
             4        64.24      78.60        .65      143.49        35.71      179.20          .00            .00
             5        35.71        .00       1.03       36.74          .00       36.74          .00            .00
             6        29.10        .00       1.33       30.43          .00       30.43          .00            .99
             7        64.24       7.18       1.90       73.32          .00       73.32          .00            .27

           SUMS      264.71      85.78       7.69      358.18        35.71      393.89          .00           1.26


 TABLE C.   PERCENT STOCKING ON EACH POINT BY TREE CLASS

                     POINT   *      CROP  PERCENT  CATAGORIES        *  EXCESS   MATURE    CULL     ALL LIVE
                     NO  .   *  *1*       *2*        *3*      TOTAL  *  PERCENT  PERCENT   PERCENT  PERCENT


                      1            .00     8.93       .00      8.93        .00     2.75      .00     11.68
                      2            .00     7.94       .00      7.94        .00      .48      .00      8.42
                      3            .00      .00       .00       .00        .00     1.40      .00      1.40
                      4            .00    14.29       .00     14.29      17.47     1.08     8.93     41.77
                      5            .00     7.94       .00      7.94        .00     1.72      .00      9.66
                      6            .00     7.27       .00      7.27        .00     2.22      .00      9.49
                      7           7.94     6.35       .00     14.29       1.59     3.17      .00     19.05

                     SUMS         7.94    52.72       .00     60.66      19.06    12.82     8.93    101.47


                         FULL CROP TREE STOCKING PERCENT PER POINT (100.0 / NO. PTS.) = 14.29
```

COMPARTMENT NAME. GRANITE COMP. NO. 2308 CELL NOS.
X-REF COMP. NOS. X-REF CELL NOS.
SISKIYOU NATIONAL FOREST RANGER DISTRICT 2 EXAM NO. 360 RUN DATE 2/ 6/81

TABLE D. NUMBER OF TREES AND GROSS VOLUME PER ACRE BY CLASS AND TREE CLASS

DBH	CROP TREES			EXCESS TREES			MATURE TREES			LIVE SOUND TREES			CULL	LIVE	SALV DEAD		UDEAD
CLASS	TREES	BD FT	CU FT	TREES	BD FT	CU FT	TREES	BD FT	CU FT	TREES	BD FT	CU FT	TREES	TREES	TREES	BD FT	TREES
S	71.42	0	.0	35.71	0	.0	.00	0	.0	107.13	0	.0	.00	107.13	.00	0	.00
1	128.48	0	.0	50.07	0	.0	.00	0	.0	178.55	0	.0	.00	178.55	.00	0	.00
2	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
3	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	35.71	35.71	.00	0	.00
4	35.71	0	.0	.00	0	.0	.00	0	.0	35.71	0	.0	.00	35.71	.00	0	.00
6	29.10	0	71.3	.00	0	.0	.00	0	.0	29.10	0	71.3	.00	29.10	.00	0	.00
8	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
10	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
12	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
14	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
16	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
18	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
20	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
22	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
24	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
26	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
28	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
30	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
32	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
34	.00	0	.0	.00	0	.0	.91	1583	272.8	.91	1583	272.8	.00	.91	.00	0	.00
36	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
38	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
40	.00	0	.0	.00	0	.0	.65	1607	269.8	.65	1607	269.8	.00	.65	.00	0	.00
42	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
44	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.54
46	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
48	.00	0	.0	.00	0	.0	1.80	7784	1248.4	1.80	7784	1248.4	.00	1.80	.00	0	.45
50	.00	0	.0	.00	0	.0	1.26	5906	941.0	1.26	5906	941.0	.00	1.26	.00	0	.00
52	.00	0	.0	.00	0	.0	.39	1994	317.5	.39	1994	317.5	.00	.39	.00	0	.00
54	.00	0	.0	.00	0	.0	1.44	7818	1242.3	1.44	7818	1242.3	.00	1.44	.00	0	.00
56	.00	0	.0	.00	0	.0	.33	1371	232.8	.33	1371	232.8	.00	.33	.00	0	.00
58	.00	0	.0	.00	0	.0	.62	4350	671.2	.62	4350	671.2	.00	.62	.00	0	.00
60	.00	0	.0	.00	0	.0	.29	1799	285.4	.29	1799	285.4	.00	.29	.00	0	.00
62	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.27
64	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
66	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
68	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
70+	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	.00	.00	.00	0	.00
SUMS																	
TREES	264.71			85.78			7.69			358.18			35.71	393.89	.00		1.26
BD FT		0			0			34212			34212					0	
CU FT			71.3			.0			5481.2			5552.5					
BASAL AREA (VARIABLE PLOT)			5.7			.0			102.9			108.6	.0	108.6			

COMPARTMENT NAME. GRANITE COMP. NO. 2308 CELL NOS.
X-REF COMP. NOS. X-REF CELL NOS.
SISKIYOU NATIONAL FOREST RANGER DISTRICT 2 EXAM NO. 360 RUN DATE 2/ 6/81

TABLE E. NUMBER OF TREES AND GROSS VOLUME PER ACRE BY SPECIES, TREE CLASS AND TREE SIZE CLASS

SIZE		CROP TREES			EXCESS TREES			MATURE TREES			LIVE SOUND TREES			CULL	SALV DEAD
CLASS	SPECIES	TREES	BD FT	CU FT	TREES	BD FT	CU FT	TREES	BD FT	CU FT	TREES	BD FT	CU FT	TREES	BD FT
0.0 - 0.9	631	35.71	0	.0	35.71	0	.0	.00	0	.0	71.42	0	.0	.00	0
	41	35.71	0	.0	.00	0	.0	.00	0	.0	35.71	0	.0	.00	0
1.0 - 1.9	631	128.48	0	.0	50.07	0	.0	.00	0	.0	178.55	0	.0	.00	0
3.0 - 3.9	492	.00	0	.0	.00	0	.0	.00	0	.0	.00	0	.0	35.71	0
4.0 - 4.9	631	35.71	0	.0	.00	0	.0	.00	0	.0	35.71	0	.0	.00	0
5.0 - 6.9	312	29.10	0	71.3	.00	0	.0	.00	0	.0	29.10	0	71.3	.00	0
21. +	205	.00	0	.0	.00	0	.0	7.36	32841	5248.4	7.36	32841	5248.4	.00	0
	41	.00	0	.0	.00	0	.0	.33	1371	232.8	.33	1371	232.8	.00	0
SUMS - TREES		264.71			85.78			7.69			358.18			35.71	
SUMS - BD FT			0			0			34212			34212			0
SUMS - CU FT				71.3			.0			5481.2			5552.5		

631 = TANOAK
041 = Port-orford-cedar
492 = Pacific dogwood
312 = Bigleaf maple
205 = Douglas-fir

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                                          COMPARTMENT NAME.   GRANITE                 COMP. NO.  2308         CELL NOS.
                                                                                  X-REF COMP. NOS.          X-REF CELL NOS.
     SISKIYOU NATIONAL FOREST    RANGER DISTRICT   2  EXAM NO. 360   RUN DATE  2/ 6/81


 TABLE F.  AVERAGE DBH (INCHES) BY TREE CLASS FOR TOTAL STAND AND SELECTED STAND PARTS


                                         TREES          TREES          TREES          TREES          TREES          TREES
                             TOTAL      6 INCHES       8 INCHES      10 INCHES      12 INCHES      14 INCHES      16 INCHES
                             STAND     AND LARGER     AND LARGER     AND LARGER     AND LARGER     AND LARGER     AND LARGER

      CROP TREES               3.0         6.0             .0             .0             .0             .0             .0
      EXCESS TREES             1.0          .0             .0             .0             .0             .0             .0
      MATURE TREES            49.5        49.5           49.5           49.5           49.5           49.5           49.5
      LIVE SOUND TREES         9.1        23.2           49.5           49.5           49.5           49.5           49.5
      CULL TREES               3.0          .0             .0             .0             .0             .0             .0


                                         TREES          TREES          TREES          TREES          TREES          TREES
                                        6 INCHES       8 INCHES      10 INCHES      12 INCHES      14 INCHES      16 INCHES
                                      AND SMALLER    AND SMALLER    AND SMALLER    AND SMALLER    AND SMALLER    AND SMALLER

      CROP TREES                           3.0            3.0            3.0            3.0            3.0            3.0
      EXCESS TREES                         1.0            1.0            1.0            1.0            1.0            1.0
      MATURE TREES                          .0             .0             .0             .0             .0             .0
      LIVE SOUND TREES                     2.7            2.7            2.7            2.7            2.7            2.7


                              NUMBER OF SEEDLINGS NOT IN ABOVE MEANS =     3
```

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                                         COMPARTMENT NAME.   GRANITE                  COMP. NO.  2308          CELL NOS.
                                                                                 X-REF COMP. NOS.          X-REF CELL NOS.
        SISKIYOU NATIONAL FOREST    RANGER DISTRICT   2  EXAM NO. 360   RUN DATE  2/ 6/81

 TABLE G.  INDIVIDUAL TREE RECORD

         * * * *  FIELD  CODED  VARIABLES  * * * *              *           * * * * *  COMPUTED  VARIABLES  * * * * *
 P                     D     C    C    D         M    P    D    T    *   T              B         C        S        B         C
 O   H   S             E                         I    T              *   R              D         U                 F         F
 I   I   P      D      F     R    C    C    A    S    O    I    H    *          T                 -        P
 N   S   E      B      C     A    L    L    G    L    C    N    G    *   C      F       F         F        C        P         F
 T   T   C      H      T     T    S    S    E    E    C    C    T    *   L      A       T         T        T        A         A

 1   1  205    50      3     7    2   23   20    0    1    7  200        M     .42    5000     787.3     .70     2100     330.6
 1   1  205    54      3     4    2   23   30    0    2    3  185        M     .36    5391     857.8     .60     1941     308.8
 1   1  205    48      1     4    2    0   30    0    3    5  195        M     .45    4455     709.6     .75     2005     319.3
 1   1  205    50      1     6    2    0   30    0    4    0  175        M     .42    4354     700.8     .70     1829     294.3   160
 1   1  631     4      0     0    0    0    0    0    5    0   15      C-2   35.71      0        .0    8.93        0        .0

 2   1  205    60      1     7    2    0   30    0    1    7  170        M     .29    6205     984.4     .48     1799     285.4   40
 2   1  631     1      0     0    0    0    0    0    2    0    8      C-2   35.71      0        .0    7.94        0        .0

 3   1  205    52      1     5    1    0   30    0    1   10  190        M     .39    5113     814.1     .65     1994     317.5   80
 3   1  205    48      1     6    2    0   30    0    2    3  190        M     .45    4318     693.6     .75     1943     312.1

 4   1  205    40      1     3    2    0   20    0    1    0  160        M     .65    2472     415.1    1.08     1607     269.8
 4   4  492     3      0     0    0    0    0    0    2    0   20        X   35.71      0        .0    8.93        0        .0
 4   1  631     1      0     0    0    0    0    0    3    0   10      C-2   35.71      0        .0    7.94        0        .0   40
 4   1  631     1      0     0    0    0    0    0    4    0   10      S-2   35.71      0        .0    7.94        0        .0
 4   1  631     1      0     0    0    0    0    0    5    0    6      E-2   35.71      0        .0    7.94        0        .0
 4   1  631     S      0     0    0    0    0    0    6    0    4      E-2   35.71      0        .0    7.94        0        .0

 5   1  205    58      3     4    2   23   30    0    1    9  210        M     .31    7203    1106.1     .52     2233     342.8
 5   1  205    54      1     5    2    0   30    0    2    7  190        M     .36    5535     878.0     .60     1992     316.0   120
 5   1  205    54      2     7    2   23   30    0    3    6  180        M     .36    5258     837.6     .60     1893     301.5
 5   1  631     S      0     0    0    0    0    0    4    0    3      C-2   35.71      0        .0    7.94        0        .0

 6   3  205    48      9     0    0   11    0    0    0    0   50       UD     .45     912     247.3     .00      410     111.3
 6   3  205    44      9     0    0   11    0    0    0    0   30       UD     .54     277     154.2     .00      150      83.2   200
 6   1  205    50      3     6    2   23   30    0    1    0  190        M     .42    4707     752.7     .70     1977     316.1
 6   1  205    34      1     5    2    0   30    0    2    0  160        M     .91    1740     299.8    1.52     1583     272.8
 6   1  312     6      0     5    5    0    7    0    3    0   30      C-2   29.10      0       2.5    7.27        0      71.3

 7   3  205    62      9     0    0   11    0    0    0    0  190       UD     .27    7389    1157.5     .00     1995     312.5
 7   1   41    56      0     6    2    0   30    0    1    6  135        M     .33    4153     705.6     .55     1371     232.8
 7   1  205    58      1     3    2    0   30    0    2    5  200        M     .31    6829    1059.5     .52     2117     328.4
 7   1  205    54      3     5    2    0   30    0    3    0  190        M     .36    5535     878.0     .60     1992     316.0
 7   1  205    48      1     4    2    0   30    0    4    0  190        M     .45    4318     693.6     .75     1943     312.1
 7   1  205    48      3     4    2    0   30    0    5    0  185        M     .45    4206     677.7     .75     1893     304.9
 7   1  631     1      0     0    0    0    0    0    6    0    6      S-2   35.71      0        .0    7.94        0        .0   [illegible]
 7   1   41     S      0     0    0    0    0    0    7    0    4      C-1   35.71      0        .0    7.94        0        .0
```

APPENDIX L

DFIT Adjusted with GBA
for

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

```
                                   PROGRAM  DFIT

                            DOUGLAS FIR MANAGED YIELD TABLES

                                    SITE INDEX=170.0 (100 YEAR BASIS).
       THE CONTROL CARD SPECIFIES THAT
           THE FIRST COMMERCIAL THINNING WILL OCCUR WHEN TOTAL AGE IS 45. YEARS.
           THE MINIMUM MERCHANTABLE DBH IS  8.00 INCHES.
           THE STAND WAS PRECOMMERCIALLY THINNED AT AGE  15. YEARS.
           THE THINNING INTERVAL IS 20. YEARS.
           NUMBER OF COMMERCIAL THINNINGS=  2.
           TOTAL AGE AT HARVEST= 90. YEARS.
           THERE WILL BE 25. YEARS BETWEEN THE FINAL COMMERCIAL THINNING AND THE HARVEST CUT.

           SITE INDEX WAS ADJUSTED TO 173.0 BECAUSE OF PRECOMMERCIAL THINNING.


        DOM +                                                   *                                           *           Q
 TOTAL CODOM                    MEAN    MEAN    MEAN            *        VOLUME   PER   ACRE                *  TREES   PER  CURRENT  DISC    CUM
 AGE  HEIGHT      STAND         DBH      Q      VOL     VOL/Q   *         4-INCH    5-INCH     6-INCH       *   PER   ACRE   PRICE   PRICE   PRICE
 YEARS  FEET    COMPONENT      INCHES  SQ FT   CU FT    RATIO   *  CU FT   CU FT   INTL 1/4    SCRIB        *  ACRE   SQ FT    $       $     w/Leave Trees
  31.0  77.5   FIRST POSS      10.67   .6206   18.21   29.35 * 4752.        0.        0.         0.   *  260.9 161.9                 #TPA    B.A
                                                                                                           170    152
  45.  111.3   MERCHANTABLE    12.87   .8980   35.10   39.09 * 9157.     8767.    52217.     41682.   *  ~~260.9~~ ~~234.3~~   0.      0.   8 0. → 91
               CUT             11.90   .7729   29.83   38.60 * 3014.     2874.    16816.     13105.   *67 ~~101.0~~ ~~78.1~~52  0.      0.  68 → 61
               MERCH LEAVE    ✓13.39   .9772   38.43   39.33 * 6143.     5894.    35401.     28578.   *103 ~~159.9~~ ~~156.2~~101          76

               SUM GROSS                                     * 9157.     8767.    52217.     41682.   *        234.3
               SUM MERCH                                     * 9157.     8767.    52217.     41682.   *        234.3
               SUM OF CUT      11.90                         * 3014.     2874.    16816.     13105.   *  101.0  78.1

   Age 55                      .16"                                                                  BA=196.8ft²   DFIT GBA10=267
               VOL GROWTH                                    * 5139.                                *
                                                                                                           103    153     154
  65.  142.5   MERCHANTABLE   16.50 1.4854   70.59   47.52 *11282.    11009.    73443.     63217.   *  ~~159.9~~ ~~237.4~~   0.      0.      0.
               CUT            14.00 1.0693   49.81   46.58 * 3649.     3547.    23029.     19182.   *47 ~~73.3~~ ~~78.3~~50   0.      0.
               MERCH LEAVE    18.36 1.8375   88.17   47.98 * 7633.     7462.    50414.     44036.   *56 ~~86.6~~ ~~159.1~~103

               SUM GROSS                                     *14297.    13883.    90259.     76322.   *        315.5
               SUM MERCH                                     *14297.    13883.    90259.     76322.   *        315.5
               SUM OF CUT      12.83                         * 6663.     6420.    39845.     32287.   *  174.3 156.4

                              .16
               VOL GROWTH                                    * 5053.                                *
                                                                                                           56    153
  90.  166.2   MERCHANTABLE   22.37 2.7292  146.54   53.69 *12687.    12460.    88781.     80016.   *  ~~86.6~~ ~~236.3~~   0.      0.      0.
  90.  166.2   HARVEST        22.37 2.7292  146.54   53.69 *12687.    12460.    88781.     80016.   *   86.6 236.3
                              16.1
     GRAND TOTALS
```

To adjust GBA to new Stand Exam B.A.

	BA	Adj.	20Hts		GBA10	By Area	
Plot 1-5	107	150	6.3	=	144	x.9	= 130
Plot 6	320	448	6.0	=	430	.1	= 43
							173 Av. GBA

$\frac{173}{267} = .65$

APPENDIX M

Managed Yield Tables
for Alternative C

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

```
**********************************************************************************

                         THESE YIELD TABLES REFLECT
                          GROSS VOLUMES ONLY AND
                           ASSUME 100% STOCKING

**********************************************************************************

FOREST: 11        SPECIES: 205

TITLE: SMU in Unit 4
       Briggs Ridge Timber Sale

              Craig
CREATED BY:   Levering   DATE: 2/20/81  REGENERATION PERIOD:     5
              Greenup
**********************************************************************************

>@ADD TOM.1         Alternative C Full Yield

>@EOF


                            FIELD DATA

                    DBH     DBH     DBH    TPA     TPA     TPA
AGE   HT   FC  TOP  ALL     CUT     LV     ALL     CUT     LV     MORT  GROWTH

 45  111   75   4   12.8    11.9   13.4   170.0    67.0   103.0     .0     3.1
 65  143   75   4   16.5    14.0   18.3   103.0    47.0    56.0     .0     4.1
 90  166   75   4   22.4    22.4     .0    56.0    56.0      .0     .0      .0
```

```
                                   BASAL AREA

AGE  ------ ALL ------          ------ CUT -------           LEAVE
      PER TREE   PER AC.         PER TREE   PER AC.           PER AC.

 45    .8936      151.9            .7723      51.7             100.2
 65   1.4849      152.9           1.0690      50.2             102.7
 90   2.7366      153.2           2.7366     153.2                .0


                       TOTAL STEM VOLUME - CUBIC FT.

      ------ ALL ------     ----------- CUT -----------        TOTAL
AGE   PER TREE  PER AC.     PER TREE  PER AC.     ACCUM.        PROD.

 45       36.2   6158.2        31.3    2097.7    2097.7       6158.2
 65       71.7   7389.9        51.7    2427.6    4525.4       9487.6
 90      147.8   8277.7       147.8    8277.7   12803.1      12803.1


                           VOLUME - CUBIC FT.

      ------ ALL ------     ----------- CUT -----------        TOTAL
AGE   PER TREE  PER AC.     PER TREE  PER AC.     ACCUM.        PROD.

 45       35.5   6036.3        30.5    2044.8    2044.8       6036.3
 65       71.0   7316.1        50.8    2386.1    4430.9       9360.9
 90      147.2   8244.6       147.2    8244.6   12675.4      12675.4


                            VOLUME - BOARD FT.

      ------ ALL ------     ----------- CUT -----------        TOTAL
AGE   PER TREE  PER AC.     PER TREE  PER AC.     ACCUM.        PROD.

 45      139.3  23682.2       114.0    7636.0    7636.0      23682.2
 65      337.7  34779.7       221.3   10401.9   18037.9      42415.7
 90      808.9  45298.5       808.9   45298.5   63336.4      63336.4


                              M.A.I.                          R.A.I.

                    AGE    CU. FT.   BD. FT.          AGE    CU. FT.   BD. FT.

                     45    134.14    526.27            50    120.73    473.64
                     65    144.01    652.55            70    133.73    605.94
                     90    140.84    703.74            95    133.43    666.70
>@FIN
```

APPENDIX N

Managed Yield Tables
for Alternative D

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

```
*****************************************************************************

                        THESE YIELD TABLES REFLECT
                         GROSS VOLUMES ONLY AND
                          ASSUME 100% STOCKING

*****************************************************************************

FOREST: 11        SPECIES: 205

TITLE: SMU in Unit 4
       Briggs Ridge Timber Sale

           Craig
CREATED BY: Levering  DATE: 2/19/81  REGENERATION PERIOD:    5
           Greenup

*****************************************************************************

>@ADD TIM
@ADD TOH.2

>@EOF
```

Alternative D Predicted Yield Resulting from Retaining 8 Large Trees Through the Rotation.

```
                              FIELD DATA

                        DBH     DBH     DBH     TPA     TPA     TPA
  AGE    HT   FC  TOP   ALL     CUT      LV     ALL     CUT      LV    MORT  GROWTH

OG→45   190   72   *    46.0     .0     46.0     8.0     .0      8.0     .0     3.0
   45   111   75   4    12.8     .0     12.8    68.0     .0     68.0     .0     3.6

OG→90   190   72   *    49.0     .0     49.0     8.0     .0      8.0     .0      .0
   90   166   75   4    16.4    16.4    16.4    68.0    60.0     8.0     .0      .0
```

```
                              BASAL AREA

 AGE  ------ ALL ------           ------ CUT -------        LEAVE
      PER TREE    PER AC.        PER TREE    PER AC.        PER AC.

  45  11.5407      92.3            .0000        .0           92.3
  45    .8936      60.8            .0000        .0           60.8

  90  13.0951     104.8            .0000        .0          104.8
  90   1.4669      99.7           1.4669      88.0           11.7


                  TOTAL STEM VOLUME - CUBIC FT.

        ------ ALL ------     ----------- CUT -----------      TOTAL
 AGE    PER TREE  PER AC.     PER TREE  PER AC.    ACCUM.      PROD.

  45      642.4   5139.5         .0        .0         .0      5139.5
  45       36.2   2463.3         .0        .0         .0      2463.3

  90      729.0   5831.7         .0        .0         .0      5831.7
  90       79.2   5387.9       79.2    4754.1     4754.1      5387.9


                       VOLUME - CUBIC FT.

        ------ ALL ------     ----------- CUT -----------      TOTAL
 AGE    PER TREE  PER AC.     PER TREE  PER AC.    ACCUM.      PROD.

  45      631.9   5055.5         .0        .0         .0      5055.5
  45       35.5   2414.5         .0        .0         .0      2414.5

  90      719.3   5754.3         .0        .0         .0      5754.3
  90       78.4   5329.1       78.4    4702.1     4702.1      5329.1


                        VOLUME - BOARD FT.

        ------ ALL ------     ----------- CUT -----------      TOTAL
 AGE    PER TREE  PER AC.     PER TREE  PER AC.    ACCUM.      PROD.

  45     4145.3  33162.5         .0        .0         .0     33162.5
  45      139.3   9472.9         .0        .0         .0      9472.9

  90     4734.6  37876.7         .0        .0         .0     37876.7
  90      380.3  25861.2      380.3   22818.7    22818.7     25861.2


                          M.A.I.                          R.A.I.

                  AGE    CU. FT.   BD. FT.        AGE    CU. FT.   BD. FT.

                   45     112.34    736.94         50     48.29    189.46
                   45      53.66    210.51         50     48.29    189.46

                   90      63.94    420.85         95     56.10    272.22
                   90      59.21    287.35         95     56.10    272.22
```

APPENDIX O

Literature Cited
for

Siskiyou National Forest
Galice Ranger Station

Unit 4 of the
Briggs Ridge Timber Sale
Riparian Ecosystem
Class III Stream

```
                              BASAL AREA

AGE   ------ ALL ------        ------ CUT -------         LEAVE
      PER TREE   PER AC.       PER TREE   PER AC.          PER AC.

 45  11.5407       92.3          .0000        .0            92.3
 45    .8936       60.8          .0000        .0            60.8

 90  13.0951      104.8          .0000        .0           104.8
 90   1.4669       99.7         1.4669      88.0            11.7


                    TOTAL STEM VOLUME - CUBIC FT.

       ------ ALL ------    ----------- CUT -----------       TOTAL
AGE    PER TREE  PER AC.    PER TREE  PER AC.     ACCUM.       PROD.

 45       642.4   5139.5          .0        .0        .0      5139.5
 45        36.2   2463.3          .0        .0        .0      2463.3

 90       729.0   5831.7          .0        .0        .0      5831.7
 90        79.2   5387.9        79.2    4754.1    4754.1      5387.9


                          VOLUME - CUBIC FT.

       ------ ALL ------    ----------- CUT -----------       TOTAL
AGE    PER TREE  PER AC.    PER TREE  PER AC.     ACCUM.       PROD.

 45       631.9   5055.5          .0        .0        .0      5055.5
 45        35.5   2414.5          .0        .0        .0      2414.5

 90       719.3   5754.3          .0        .0        .0      5754.3
 90        78.4   5329.1        78.4    4702.1    4702.1      5329.1


                           VOLUME - BOARD FT.

       ------ ALL ------    ----------- CUT -----------       TOTAL
AGE    PER TREE  PER AC.    PER TREE  PER AC.     ACCUM.       PROD.

 45      4145.3  33162.5          .0        .0        .0     33162.5
 45       139.3   9472.9          .0        .0        .0      9472.9

 90      4734.6  37876.7          .0        .0        .0     37876.7
 90       380.3  25861.2       380.3   22818.7   22818.7     25861.2


                         M.A.I.                         R.A.I.

                AGE    CU. FT.   BD. FT.        AGE    CU. FT.   BD. FT.

                 45     112.34    736.94         50     48.29    189.46
                 45      53.66    210.51         50     48.29    189.46

                 90      63.94    420.85         95     56.10    272.22
                 90      59.21    287.35         95     56.10    272.22
```

Literature Cited

Curtis, Robert O.

1975. Growth and Yield in Uneven-Aged Stands: proceedings of two In-Service Workshops on Uneven-Aged Silviculture and Management in the United States. [Morgantown, West Virginia, July 1975 and Redding, California, October, 1976.] U.S.D.A., Forest Service, p. 186-196, Washington D.C.

Greaves, R.D.

1978. Planting. In Regenerating Oregon's Forest. Oreg. State Univ., Corvallis, p. 134-148.

Franklin, Jerry F. and C. T. Dyrness.

1973. Natural Vegetation of Oregon and Washington. USDA For. Serv., Gen. Tech. Report, PNW-8, 417 p.

U.S.D.A., Forest Service.

1980. Environmental Assessment for the Proposed Briggs Ridge Timber Sale. Siskiyou National Forest.

U.S.D.A., Forest Service.

1979. Rogue-Illinois Planning Unit Final Environmental Statement. Siskiyou Natational Forest, 370 p.

U.S.D.A., Forest Service.

1979. Soil Resource Inventory for the Siskiyou National Forest. 258 p.